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Vol 4 No 47

Acorn paves way for 16-bit BBC machine

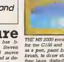
ACORN has unveiled its long-awaited Communicator micro/modem/telephone device to rival ICL's QL-based One-Per-Desk unit

The Communicator is the first Acorn product to use the 16-bit version of the BBC and Electron's 6502 processor, the 65SC816 chip.

Its launch at the Compec Business Computer Show has increased speculation that the 16-bit version of the BBC – the BBC C – based on the same chip, may be released next year

Acorn is committed through its agreement with the BBC which has another four years to run, to continue to introduce new BBC models. The 65SC816 software compatible 16-bit version of the BBC micro was originally expected to have been released in time for Christmas but Acorn's cash troubles and the two financial rescues by

continued on page 5▶



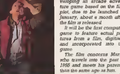
THE MS 2000 mouse package for the C128 and C64 can act as a pen, paint brush or air-brush, to draw straight lines, free lines, dotted lines, rectangles, circles, or ellipses

The software is icon-driven, using pull-down menus

It costs £69.90, including the software. Details from Wigmore House, 32 Savile Row London W1

INSIDE THIS WEEK

Back to the Future



ELECTRIC Dreams has licensed the new Steven Spielberg produced movie Back to the Future and is developing an arcade adventure game based on the film plot, due to be launched in January, about a month after the film is released

It will be the first computer game to feature actual pictures from a film, digitised and incorporated into the game

The film concerns Marty, who travels into the past to 1955 and meets his parents, than the same age as him.

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MICRO MAGIC



Find out if you have won an Amstrad 6128 this week or at least some special *Popular Computing Weekly* cassette labels. Enter your personal Micro Magic number into our special computer program on page 36.

INSIDE ❯ WORLD DOUBLES SNOOKER TICKETS TO WIN — SEE PAGE 6 ❯


LORD OF THE RINGS
GAME ONE
AT LAST! The eagerly awaited sequel to the fabulous classic "The Hobbit" is now available "The Hobbit", classed as 'the ultimate adventure game of all time', was just a taste of what you can expect in LORD OF THE RINGS
Astonishing vocabulary graphics and more locations than you could imagine possible!
LORD OF THE RINGS Game 1 is available on C64, BBC, Spectrum and Amstrad at £15 95 This stunning package includes two cassettes, large booklet and a copy of "The Lord of the Rings" Part 1
MELBOURNE HOUSE

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Vol 4 No 47

EDITORIAL

Anyone who is intending to buy a micro this Christmas faces a bewildering and unprecedented choice

With 20 or so different models to choose from, where does one begin? The most disturbing aspect of it all is that never has the future looked so uncertain Not in terms of company crises since in fact after a traumatic year most companies now look relatively stable, but in terms of machines

How many of this Christmas's micros will continue to be manufactured next year? And how many of next year's models will be compatible with the old ones? The answer is comparatively few of this Christmas s micros look to have a long future. And the new machines will be only upwardly software compatible

Sinclair for example is likely to launch its second QL model next year It is unlikely to have microdrives and seems certain to have more than 128K. Programs for the new micro may be too big to run on the present QL The 128K Spectrum also has the same memory advantage together with better sound

What about Commodore's Plus/4 and C16 models? The company looks set to discontinue their manufacture next year and the main thrust of Commodore s activities is already going behind the C128 and Amiga. Will the final version of the Atari 520ST be the same as those being sold now? There has already been one Rom upgrade

There is really only one guide Without software the micro is just a mess of electronic components which can be very time consuming to bring to life Choose on the basis of what software is available for each micro Available now ... not at some time in the future

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How to submit articles Articles which are submitted for publication should not be more than 2000 words long The articles and any accompanying programs, should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work

Computer Trade Association Magazine of the Year

Spectrum settles Soft Aid storm

OVER £100 000 raised through the *Soft Aid* appeal due to be transferred to Band Aid at the end of October but until last week still being held by the charity tape's distributor MicroDealer (see *Popular Computing Weekly*, November 14) is now to be paid over in full.

The company has reversed its earlier decision to pay the money in unspecified instalments and will release the full amount this week.

"I have been in contact with John Kennedy at Band Aid and we have agreed to pay over as soon as possible every single penny owed," said Michael Stern, chairman of MicroDealer's parent company Spectrum Group.

"I have today made out a cheque for the full amount owed until the end of November for £130,144.09 and we will be making further payments for the continuing sales of the *Soft Aid* tape in December and January."

"I am extremely disappointed in the way the *Soft Aid* deal has been handled. I really did not know anything about this because MicroDealer runs as a completely separate enterprise. I am a man of honour and I have never come across a situation like this in the whole of my business life. I can assure you that as long as I am chairman of Spectrum Group every single penny that is owed to Band Aid will be paid over."

Stern: man of honour

John Kennedy for Band Aid confirmed he had received the *Soft Aid* cheque and said, "I am very pleased indeed that it has been possible to resolve the problem so quickly."

Last week Michael Stern was still trying to fathom out the details of the original verbal agreement between Rod Cousens and MicroDealer's joint managing director Neil Johnson. Neil Johnson left the company several weeks ago.

"It was incredible that there was no written agreement relating to the *Soft Aid* distribution and fund collection," he commented.

● Spectrum Group – which distributes photographic equipment as well as home computers and software, last week announced financial results for the year to June 30 showing, despite turn-over up from £29.8m to £48.7m, an overall pre-tax loss of £5.12m. This compares with a profit of £1.8m for the previous year. The severe down-turn in the home computer market was blamed for the loss.

ST gets program boost at Compec

NEW SOFTWARE for the Atari ST was well to the fore at Compec, the hardware and software exhibition for professional users, held at Olympia from November 12-15.

TDI Software introduced *TDI Modula-2/ST*, its modular programming language for software writers. It contains a full Gem interface and a full screen editor and compiler at £99.95. The company also showed UCSD Pascal, a full implementation of the language with a TOS filer for access to ST data at £145. Details from TDI at 29 Alma Vale Road, Bristol.

Lasersoft launched an ST version of its *Laserbase* database, originally developed for the Macintosh.

Chipsoft showed *ST Accounts*, a fully integrated accounting package comprising sales ledger, purchase ledger, nominal ledger and stock control. It was written specifically for the ST under Gem. Designed with small businesses in mind, it costs £287.50. Details from Chipsoft at 302, High Street, Slough, Berks.

On the hardware side, Acorn launched its Communicator micro (see separate story) and Commodore again tantalised visitors by only showing the Amiga at a nearby hotel to those with special invitations. Amiga representatives at Commodore's hospitality suite at Compec were closely guarding the whereabouts of the Amiga to would-be gatecrashers.

C128 monitor interface on the way

MICRO OWNERS up-grading to the new Commodore 128, should soon be able to use their existing 80-column monitor with the 128, thanks to an interface being developed by Robcom.

The C128 an RGB-I 80-column output and most monitors on the market – accept Commodore's own 1701 model specifically for the C128 at £299.99 – require an RGB input.

Robcom's interface, though, will convert the RGB-I output into a form acceptable for an RGB monitor.

Further details from Robcom, 38 Market Place, London NW11.

Management buy-out at Thorn EMI

A MANAGEMENT buy out is being organised at Thorn EMI Computer Software, following Thorn's announcement that it is to cease investment in its home entertainment distribution and publishing division.

Henry Kitchen, general manager of its international micro software department hopes that the new company will be up and running before the end of the year.

"The entertainment ranges, such as Creative Sparks and Sparklers, will come with the buy-out, as does the distribution," he said.

Thorn/EMI software, through its label Creative Sparks, produced a number of charting titles including *Macbeth* and *Orc Attack*.

Toshiba's new MSX now here

TOSHIBA'S enhanced MSX machine, the HX-23, is now in the shops. At £249, the machine features a built in RS232C interface, 80K Ram and 64K Rom. Part of that Rom space is taken up by the built-in word processor, *Bank Street Writer*.

"It's a bit late – we originally intended it for September, but this is the machine that takes us over into 1986," said Chris Greet, product manager of Toshiba UK.

Toshiba's first MSX micro, the HX-10, is currently being sold in a bundled package with software and a data recorder for £99.99, and looks likely to be phased out after Christmas.

"We'll probably be very low on stocks of the HX-10 next year," Chris Greet continued.

"But the prospects for MSX next year are looking good; interest in the standard has definitely been increasing."

Future dreams

◄ continued from page 1

The film and game are about his adventures in 1955 and efforts to get back to 1985.

Back to the Future is the first of a series of film tie-ins licensed by Electric Dreams from Universal Pictures. At least two more are planned, based around major pictures currently in production and to be released during 1986.

Acorn paves way for 16-bit BBC machine

◀ continued from page 1

Olivetti earlier this year are thought to have put back Acorn's plans

"If there was to be a BBC Model C we wouldn't admit it," said Bob Coates, Acorn's BBC micro product manager "At the moment the concept of extending the BBC range is out of the window Effort is now going into developing the BBC as the European standard for educational micros"

The Communicator – like the suggested BBC C – is Basic compatible with BBC Basic version 3.0 Just as with Sinclair's One-per-Desk project, it will not be marketed or produced directly by Acorn. Instead it will be sold as a product to be 'badged' Both Acorn's parent company Olivetti and the British office automation firm ITL have apparently already shown interest in the machine

The Communicator has Ram sockets for either 64K or 256K bit chips, so that the memory can be 128K or 512K. The machine can either use its own telephone handset available as an extra or can use an existing telephone connected to the Communicator. It also has a built-in V21 and V23 standard modem, Centronics compatible printer port, RS432 port, expansion bus, and RGB monitor output A small liquid-crystal display is available as an optional extra A number of software packages are available for the system including Acorn's MOS (modem operating system), Econet BBC Basic, and a number of utilities and applications programs It can also be quite easily made BBC machine-code software compatible

It has a full qwerty keyboard with separate numeric pad which can be used either as a calculator or telephone dialler

An Acorn spokesman at Compec said that Acorn was now taking orders for the Communicator, and that the first production models would probably be seen early next year. When available, the machines will cost around a £1,000 for the basic model

Superman out this week

SUPERMAN, Beyond Software's star title this Christmas, should be released for the C64 this week, after a delay of several weeks

"First Star is very concerned that the holder of the UK rights which is Beyond, and the European rights owner should get the title absolutely simultaneously," explained Clive Bailey of Beyond.

The European rights owner is US Gold, which will be making *Superman* available for export to the continent

Yummie Yuppie and trendy

HEALTH, wealth and self-improvement software will be the next growth area for the software industry, according to an American research report

The focus of the market will shift to the post-Yuppie generation and baby boomers', says the International Resource Development Inc which predicts that a program which will evaluate a likely death date for the user and then output ways in which the user can postpone the inevitable will be big business in the late eighties

Other areas where software packages could be useful are program to help people improve their memory, give up smoking, cut down on alcohol and exude sexual self-confidence.

International Resource Development is asking £670 for its report, entitled *Health, Wealth and Self-improvement Home Software*

Letters

Limited protection

I read with interest your editorial concerning piracy (issue November 7) and the frustrations of using anti-piracy systems.

I have just falled foul of the Lenslok system on the Spectrum version of *Elite* and feel I must warn others of its limitations.

Beware! I cannot get it to work easily with either my large 26 inch screen colour TV or my small – screen portable black-and-white. So, after hours of frustration I find I can't play the game – yet there is no warning of the apparent limitations of the Lenslok system given anywhere on the packaging.

The most irritating aspect of the whole affair is that Lenslok is totally unneccessary to protect *Elite*. It would be impossible to play the game without the 60-page instruction booklet or the keyboard function chart supplied in the package.

I have written to Firebird concerning the limitations of Lenslok and am awaiting their reply with interest.

Paul Ioannou
11 Second Avenue
Manor Drive
Halifax
N Yorks

We would be interested to hear of other people's experiences with Lenslok and other protection devices. Certainly, we have experienced difficulties loading games with Lenslok, and have even managed to confuse the Lenslok devices from different games. Surely, any protection system must be simple to use?

Warm appreciation

I would like to express this Trust's warmest appreciation for the extremely generous support from your readers, for our memorable Telethon event.

It was the help of this sort which has made it possible for us to give the backing to so many excellent causes for youth which really deserve all the support they can get.

I would like to say a very big thank you to all who contributed.

Baroness Lane-Fox
Chairman Thames Help Trust
306-316 Euston Road
London NW1 3BB

Customer in mind

Amstrad and Alan Sugar have come in for a lot of stick lately in *Popular*'s letters pages, mainly on the grounds that they don't care about their customers because they introduced the 6128 machine so swiftly after the 664.

I think it's time the balance was redressed a little, as my own recent experiences with the company show they have the customer very much in mind.

I was lucky enough to get one of the first batch of PCW8256 machines to reach Dixons, an important machines to me as a freelance writer making the switch from the typewriter to word processing. After a few days I discovered a problem with the feature which automatically page-numbered a document, the problem being that it didn't.

This turned out to be a bug in the first version of *LocoScript*, and a few days after reporting it I received a replacement disc with version 1.04 on it. A few days later another disc arrived, this time containing version 1.1.

Since then I've had a couple of other queries about using *LocoScript* to do certain things the first being replied to by letter within a matter of days, the second by a lengthy phone call from Roland Perry who helped write the program as well as design the original CPC464. He was genuinely interested in how I found the machine and *LocoScript* in use.

I do think Alan Sugar made a bad decision over the release dates of the 664 and 6128 machines but we're all entitled to one mistake and as far as I'm concerned he's never made any others. He produces excellent computers at very cheap prices with the lowest return rate in the industry. He delivers them on time, told people how many PCW8256s he was bringing in, doesn't produce misleading advertisements and doesn't hang on to his customers' money for several months without providing the goods.

Give the man and his company a break.

It all started to go wrong when I discovered I needed a new monitor to up-grade my Commodore 64

Mike Gerrard
London, N4

BBC software

I am writing to remind you of the fact that there is such a computer called the BBC. Your seem to have forgotten this.

C Murray
6 Sarum
Roman Wood
Bracknell
Berks

We haven't forgotten the BBC at all, there just hasn't been much new software for the BBC in the past couple of weeks.

CDS Competition

Another ball game . . .

This week *Popular Computing Weekly* goes for maximum break with a competition to win two tickets for the World Doubles Snooker Championships. Five runners-up can have their pick of five great prizes featuring snooker champion Steve Davis.

The prizes come courtesy of CDS Microsystems whose computer snooker program endorsed by Steve Davis is available on all the popular home micros including Commodore 64, C16, Spectrum, Amstrad, QL and Enterprise. Versions for other machines are planned.

The prizes

First 2 tickets to the Hoffmeister World Doubles Snooker Championship at Northampton. These will be for the final day's play on the 15th of December.

Five runners up may have their choice of prize from the following

a) Steve Davis T shirt
b) Steve Davis Sweat Shirt
c) Steve Davis Cue
d) Steve Davis Video
e) Steve Davis Autobiography.

The Competition

To win you have to correctly answer the questions below. Winners will be the first six correct answers drawn at random on the 6th of December. Send your answers to Steve Davis Competition, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP

Questions

1) What, in snooker, is the correct order for potting the colours?
2) Who is the current Snooker World Champion?
3) What is the total score value of all the coloured balls?

Answers

1) ....
2) ....
3) ....

Your Address ....
....
....

Micro owned ....

Prize preferred ....

All entries must reach us by 12pm on the 6th December. The editors decision is final.


Trying to play all the games you can get for the Sincla
(About 5,000 times.)



How would you like to be blasted out of the sky by anti-aircraft guns?

Or perhaps you'd prefer to be vapourised by a Thargoid starship.

Or eaten for breakfast by mutant rats.

Well, you have all this and more to look forward to, if you get a Sinclair Spectrum +.

Because there are more games available for the Spectrum + than any other home computer.

(About 5,000 the last time we counted.)

Not all of which lead to such sticky ends, we might add.

You may, for instance, rather battle it out on the chess board with a Russian grand master. Or cross swords with Nick Faldo on the golf course.

You won't just have the pick of the current titles either.

You'll get first shot at the new ones too. Because most of them become available for the Spectrum + before anything else.

And because there are so many other Spectrum owners there are more books and magazines and clubs to join.

So if you get a Spectrum +, you may well end up in a Grand Prix pile-up.

And your chances of being killed by Gremlins are very high.

But you'll never die of boredom.

sinclair

Xmas micro guide

In this guide to currently available microcomputers we have tried to look at the position both from the point of view of the first time buyer and of the upgrader. We have tried to be clear and unequivocal in our comments because, after all, a lot of money may be at stake. Nevertheless, remember that somebody, somewhere, thinks that nothing could ever surpass the dear old ZX81

Amstrad CPC464

A Z80 based 64K computer with a screen resolution of 640 x 200 pixels, a choice of up to 27 colours and an 80 column text screen using a monitor supplied as part of the machine. Choice of green screen or colour monitor. The keyboard is reasonable quality, suitable for typing and features a numeric keypad, a cursor cluster and a facility to redefine up to 32 of the keys for specific functions.

The CPC464 also features a built-in cassette unit which has the immediate advantage of neatness and compatibility, but has the disadvantage of requiring the whole unit to be sent away should it break down.

The machine has an excellent Basic with many sophisticated features including facilities to make use of system interrupts, and a three channel sound chip similar to those found in other home micros. One unusual feature is stereo sound output if connected to a hi-fi system. A Centronics port is standard.

Software

Unlike almost every other computer company in the country, Amstrad got the launch of the machine right and from day one there was software available. This was part of the reason for the machine's success and its success has in turn ensured plenty of software support. It is fair to say that the Amstrad is now nearly as well supported on new software releases as the Commodore and the Spectrum.

Amstrad software is comparable with Commodore 64 and Spectrum software, although it still tends not to get games specifically developed for the strengths and weaknesses of the machine, but rather conversions of Spectrum titles. Sometimes (as with some of the Ultimate titles) these surpass the originals. With the addition of a disc drive giving CP/M compatibility, the Amstrad has better business software support than either the Spectrum or the Commodore 64.

Expandable?

Adding a disc drive to the 464 gives you not only fast program access but CP/M compatibility, which ensures a business software future for the Amstrad. Peripherals include light pens, speech synthesisers, Rom boards and serial interfaces. There is every reason to believe support will continue and grow particularly since peripheral devices for the CPC 464 should also be suitable for the 6128 (see below) giving potential suppliers a large market.

The only doubt over the machine's future is the same as that affecting all the most successful machines here – the technology is relatively old and at some point it will be superseded by more powerful machines. For most buyers this should not be a major concern, though.

Overall

The Amstrad 464 is a good first choice of machine for those who want a computer for the family. It is suitable for small business purposes (with the disc drive) and having a monitor included in the package means no TV arguments and better display.

If you are certain that your Amstrad will only be used for word processing/accounts purposes the green screen monitor will do, otherwise you would be well advised to spend the extra cash on the colour monitor. It is vital for games and most significantly there is yet no way of upgrading later, anyway you would end up with a wasted green screen monitor. Potential business users should probably be looking at the 6128.

When to buy

Chances are the CPC464 is about as cheap as it's going to get. Amstrad's policy of upward compatibility means that it forms the entry level machine to a standard Amstrad will continue to build on. As such it will be supported for a while yet.

Amstrad CPC6128

Main technical features are as CPC464 since the two machines are in these respects identical. The 6128 comes with a built-in disc drive and 128K of memory. This also means that it automatically has CP/M compatibility (as when you buy a disc drive for the 464). The machine does not have a built in cassette, but will nevertheless load cassette software from your own cassette player.

The 128K actually gives 41K available to Basic though some of the extra memory can be used to hold data or screen information. CP/M is given 61K.

Software

Compatible with all CPC 464 programs except a handful produced by independent suppliers. It has full compatibility with CP/M 80 except that the Amstrad uses 3" discs rather than the usual 3½" format. Virtually nothing is available 'off the shelf', although Amstrad seems to be making some efforts to gain licences.

The CP/M compatibility has some problems associated with it. Many of the big name CP/M programs like *Wordstar* cost £200 or more. Their manufacturers are not keen to make them available at the kind of prices appropriate to home micro owners.

What seems more likely to happen is that Amstrad will make available some of the lesser known CP/M titles at a more reasonable price.

Expandable?

As CPC 464. It looks set for a good fine years. Don't expect to see many games specifically for the 6128, since it isn't really in suppliers interests to produce games which aren't 464 compatible

Overall

If your budget will go this far and being on the cutting edge of technology is important to you, this must rank highly. It is excellent value and a potentially valuable tool for small businesses at a fraction of the cost of anything similar. See 464 for colour monitor choice

When to buy

Not likely to get much cheaper

Amstrad PCW8256

A Z80 based computer with 256K of Ram. Although related to the technology of the other Amstrad machines, the PCW8256 is different in several important respects. It does not have colour graphics or sound, but instead features a 90 column by 32 lines display on a monitor. A 3" disc drive is built into the monitor space and a printer comes as standard.

The 82 key keyboard is specifically designed for use with the sophisticated built-in word processor which forms the *raison d'être* for this machine – the PCW8256 is simply an excellent word processor at an astonishing price. That it will also run CP/M, comes with a sophisticated Basic and DR Logo as standard is not insignificant.

Software

This machine is not compatible with other Amstrad micros – something some dealers seem to be curiously unaware of when they are selling you one. It will run CP/M, but suffers from the same problems as the 6128 and the fact that *Dbase II*, for example – an obvious office partner for the word processor – costs nearly as much as the system.

Nevertheless, Amstrad does seem to be sticking to a promise to get plenty of CP/M material converted to 3"

Expandable?

Essentially a unit designed for a specific purpose so questions of expandability become less important. There is an option to connect a 3" disc drive (very significant for the reasons given above) and to connect another printer.

Overall

In the end it seems that most micro owners only find one or two serious uses for their machines – word processing and storing information. If you are sure that your requirements will never extend to games or colour graphics, this is your first choice machine

When to buy

Won't get cheaper, but might be worth waiting to see what software turns up

Atari (except 520ST)

Though remodelled a couple of years ago, the Atari machines (memory is the only difference) have been around for ages – before the Spectrum, in fact. It is testimony to the excellence of the original design that in many ways they are graphically superior to any of the machines in their price bracket today

The machines have a 6502 chip and a number of specialist chips for sound and graphics, which give superb results. For example, the sound chip is rivalled in facilities only by the Sid chip, but has four instead of only three channels

The maximum screen resolution is 320 by 192 with a choice of 256 colours, up to 128 of which may be on screen at the same time. The keyboard has 62 keys including a number of special function keys for Basic commands like *Reset* and *Start*. Standard ports include a Rom slot, two joystick inputs, monitor connection and an edge connector

Software

A complex situation. There is a vast amount of existing software for this machine mostly from America, but there is relatively little support for it in this country. There are games which will certainly be converted for the Amstrad, Spectrum and Commodore, but almost never converted for the Atari. This does mean that Atari owners miss out on much of the most exciting home grown software. There is no question, however, of being 'stuck' with an unsupported machine

Expandable

There are a vast number of Atari peripherals of every kind. A wide choice of printers and graphics tablets, light pens, etc, etc. The only problem is that connecting non Atari products requires an interface such as the 850 interface module (£98)

Overall

The machines are being offered in various bundle options at very cheap prices

If you aren't worried abut having any particular titles available to you and are happy to 'put up' with classics like *Pole Position* and *Raid on Fractalus* you won't find anything cheaper. One point: buy a bundle that includes a tape machine

The 128K Atari XE is a recent machine fully compatible with the old ones, but with extra memory and a stylish new keyboard. There is not, however, any software available that makes use of the extra K and it does not, like the bigger Amstrad machines, have any compatibility with another operating system

When to buy

Can't get much cheaper

Atari 520ST

Utterly different from the other Atari machines, indeed potentially more powerful than any other machines, here. The Atari ST uses much more recent technology than the others: the 68000 processor is faster and can address a larger memory. The machines comes with 512K as standard although a 260ST is still awaited.

The machine comes with a wide variety of ports, centronics, serial, RGB video output, joysticks, mouse connection and Midi giving it compatibility with electronic musical instruments

The ST features Gem command system – an equivalent to the Apple Macintosh's highly regarded system of icons and mouse operated user interface

Despite Midi, the ST comes with a fairly standard sound generator like that on the other Atari machines. Where the extra power really shows is in the graphics – a maximum resolution of 640 by 400 pixels and 512 colours. To get the benefit of this, you will need to buy a high resolution monitor and a disc drive

The extensive keyboard has 95 keys and a numeric keypad, although many commands can be issued via the mouse which is included in the system

Software

There isn't any. Well, that's not quite true: there are a tiny number of pieces of independent software, mostly sophisticated utilities for machine code programmers. The machine does come with Gem Paint graphics system and Gem Write word processor as well as a couple of operating systems but essentially the machine is too new for any real software base to have built up yet

Expandable?

The memory can be expanded almost ad infinitum. The machine is compatible

with most printers and other devices like modems. Atari can be expected to agressively support the ST if it proves successful.

The Midi compatibility is a nice touch for musicians and means recent electronic keyboards can be connected and controlled from the ST

Overall

A wait and see. Though cheap for the price, in one sense, the 520 ST with a monochrome monitor and disc drive nevertheless costs £749 and a colour monitor will almost certainly be necessary at some point. A better bet looks like being the 260 ST which will come with a built-in disc drive for around £400 to £500 (that reduced memory won't bother most people) and is more likely to gain big sales. Then we could see some exciting software for the machine. For those who are really interested in the state of the art, for whom money is no object, an Amiga would be a much better choice

The problem with the ST is that nobody is keen to be part of an experiment with a new technology and everyone is waiting for everyone else. I can't advise you to do differently

When to buy

Wait. Wait. Wait

CBM C16 and Plus/4

These two machines are compatible, although marketed differently. The C16 sold reasonably well last Christmas, but it is fair to say that both machines have been major failures for Commodore. There are a variety of reasons for this, their own competition from the 64 is one, the memory of the C16 another

The Plus/4 is marketed as a sort of business machine and reference is made to the built-in business software it contains. However, this software is barely beyond a toy and would not be suitable for most day to day business purposes.

We have not included full details of these machines simply because the advice is simple – they have almost no software support, are unlikely to get any and cannot be recommended, despite the fact that a number of chains are offering them at very low prices

Commodore 64

A very successful machine in this country only beaten by the Spectrum for sales. The Commodore 64 is highly regarded as a games machine because of its good quality graphics (similar the the Atari but with less colours), and extraordinarily good sound. The Sid chip, though only three channels, is very powerful and does amount to a synthesiser within the machine. A number of recent software titles have indicated just how flexible the chip can be. Although nominally 64K, the memory for most programming purposes is more like 40K.

The biggest complaint about the Commodore is its very poor Basic which gives no easy access to the high res graphics or sound. This makes life very difficult for the beginner who finds that a whole string of *Pokes* is needed to use the sound chip effectively. This is one reason why the machine has done fairly badly in educational markets

The main 6502 processor is also slow and there are a few occasions where this has meant games which run less effectively on the Commodore than, say, the Spectrum

Software

Vast. Almost all the major games houses in this country support the machine and

'The Buyers Guide

	Spectrum Plus package	Sinclair QL	Commodore 16 starter pack	Commodore 64 Christmas Compendium	Commodore Plus/4	Commodore 128	Acorn Electron	BBC Plus 64K	BBC Plus 128K
Boots	£130 99	£199.99		£199 99	-	£269 99 (in top 99 stores only)	-		-
Comet*	£129.99	-		-	-	£299 90 (and with 1570 in single package)			-
Dixons/Currys	£130	£190	£49 96	£199	£99 99	£269 96	£99	(by special order only)	(by special order only)
Greens	£139.99 (includes light pen)	-	-	£139 90	£99.99	£289 99 (in selected stores) £449 with 1570 disc drive		-	-
John Lewis	£128	£199	-	£199	-	£469 (with 1570 in package)		-	£480
John Menzies	£139 99	£199 90 £289 99 (with Seikosha CP8 printer)		£199 99	-	£269.99	-	-	-
Laskys	£130 99	-		£199 99		£269 99 (£449 99 with 1570)	-	-	-
Rumbelows	-	-	-	£199	-	£269		-	-
WH Smith	£139 99			£199 99		£269.99 (in selected stores only)		-	
FW Woolworth	£109.96 (cpu plus software only)		£49.96	£199 99	-	-	£49 99 (selected Woolco stores only)	-	
Selfridges	£130 90	£199	-	£199 99		£269 99		-	-
Spectrum Group†	£139 99		-	£199 99	-	£269.33	-		£499

* Prices reviewed regularly but were correct when going to press
† Prices approximate – exact price is decided by individual stores

there are few new titles that do not appear on it. Games are frequently of excellent quality and variety The machine is marginally less well supported in terms of other kinds of software, the educational market has already been mentioned

Nevertheless there are plenty of databases word processors and languages to go around Serious software is marginally more expensive on the Commodore than the Spectrum.

Expandable

No problems here, there are plenty of peripherals available for the machine from digitisers to sound samplers In fact musicians will find a host of different sound generation and controlling devices available However, to connect the 64 to conventional printers and modems, various interfaces are required

Overall

A good choice as a games machine, a less good one for education As a business machine the C64 is a contender but perhaps not first choice because of the compatibility problems.

When to buy

Unlikely to get any cheaper nor will it be superseded by anything at a similar price See C128

C128

A curious hybrid machine recently launched. It features a Commodore 64 and a Z80 processor for CP/M compatibility in one box Somewhat similar in its effect to the Amstrad 6128 Whilst the standard Commodore disc drive is, unlike the built-in Amstrad one, 5¼" and therefore immediately CP/M compatible it is not part of the machine and must be bought separately. Without it the C128 is merely a Commodore 64 and therefore the disc drive can hardly be regarded as optional This makes this machine rather expensive compared to the Amstrad 6128, which offers similar facilities for less and includes a monitor.

Expandable?

As Commodore 64 plus the bonus of CP/M compatibility

Software

As C64 plus CP/M although, again, relative to the price of the machine much CP/M software is expensive

Overall

As a Commodore 64 this is a machine with plenty of software backup, in its other guises it becomes rather an expensive way of getting CP/M compared to the Amstrad 6128

When to buy

Some problems getting hold of the disc drives at present, so wait. The very cynical are betting on it not doing well at its current (with disc drive) price

BBC B

The basic specifications are a 6502 processor with 32K Rom and a maximum screen resolution of 640 × 256 pixels A large number of ports come as standard including a Centronics printer port four analogue ports, a user port and a serial interface Sound facilities are similar to the Amstrad, although the various sound parameters are more complex

The point about the BBC is flexibility – there are a vast number of possible permutations The BBC + is essentially the same machine with 64K instead of the usual 32K and the BBC 128 has 128K.

Software

Plenty of software around, particularly of an educational bias The machine is still the popular choice for schools and is outrageously overpromoted on every BBC TV computer programme. Some basic programs like word processors and databases are available as chips

The computer is much less well served for games whilst there are plenty around and a few classics like *Elite* and *Revs*, most of the more interesting

to What's Where'

	Amstrad CPC 464	Amstrad CPC 6128	Amstrad PCW 8256	Atari 800XL	Atari 130XE	Atari 520 ST	MSX	Tatung Einstein	Enterprise 128	Memotech MTX 512
	£299 colour £199 mono	£399 colour £299 mono			£209.99		Toshiba HX 10 package £99.99			-
	£299.99 colour £199.99 mono	£384.99 colour £289.99 mono					-			
	£299 colour £199 mono	£399 colour £299 mono	£460	£69.99 (with data recorder software joystick) £199.99 (with 1050 disc drive)	£199.99	-	Sony Hit Bit £69.99	£299 (special package)		
	£299 colour £199 mono	£399 colour £299 mono	-				Toshiba HX 10 package £99.99	-		
	£299 colour £199 mono	£384 colour £289 mono	£460				-	-		
	£299 colour £199 mono	£381 colour £299 mono	£459.99	-	-	-				-
	£291 colour £150 mono	£399 colour £299 mono			-	£749.99	Toshiba HX 10 package £99.99			-
	£296 colour £199 mono	£399 colour £299 mono		-			Toshiba HX 10 package £89.99	-		
	£299 colour £199 mono	£399 colour £299 mono	£458.85	-	-	-				-
	£299 colour £199 mono	-	-	-	-		Goldstar £149 (selected Woolco stores only)		-	-
	£299 colour £199 mono	£399 colour £299 mono	£457.99			£799	-	-	£269.95 (64K £179.95)	
				£99.95	-	-			-	£69.98

Prices are subject to change without notice but to the best of our knowledge were correct at the time of going to press.

ulies do not appear on the machine This is partly because the memory of the basic machine – 32K is too little, and also reflects the fact that the machine is not as popular for games as the Spectrum/Commodore 64/Amstrad triumvirate

Expandable?
It is the expandability of the BBC that has kept it going over several years There are additional processors, teletext adaptors, Prestel adaptors, speech chips, even an IEEE adaptor and a Winchester disc The BBC B's standard disc drive is excellent and fast and is one of the reasons the BBC has been used successfully as a business machine

Overall
The BBC B (and the other BBC machines) are by general agreement overpriced and underpowered They have two large virtues, BBC Basic which, being used in schools, means continuity for your children at home and flexibility through the vast number of ports

When to buy
People are always predicting a BBC price drop and it may be that because it has been dropped recently the basic BBC B may be around cheaply

Electron
As BBC B except that this cut down machine lacks most of the ports found in that machine and some of the graphics modes Although the Basic is exactly the same, some of the more sophisticated hardware controlling Basic commands are not available

Software
Less available than the BBC, though there are few major differences between the machines Some companies produce programs with a BBC version on one side and an Electron version on the other There is little quality disc based business software for it.

Expandable?
Much less than the BBC, Acorn do a basic add-on but the machine is far less well supported.

Overall
Best to avoid the Electron unless your main concern is BBC Basic compatibility.

When to buy
Available in some cheap 'bundle deals from specialist chains for Christmas

MSX
MSX is not a machine but a standard. There are various, mainly Japanese, machines which run MSX but they are essentially the same Differences revolve around layout and keyboard rather than anything else The basic MSX standard is fairly similar to the Amstrad 464, Z80 processor, 64K (mostly), graphics resolution of 256 by 192 pixels and the fairly powerful Microsoft Basic

The MSX machines are fairly well supplied with ports including Centronics, twin joysticks, video and cartridge Most MSX machines feature high quality keyboards with function keys

Software
Generally poor The machines are supported by a few companies but most software comes via Japan and Europe where the MSX system has been more successful At their best the MSX games are up to anything seen on the Commodore 64 indeed with their use of sprites they tend to look fairly similar But there is plenty of sub standard material out at full price on MSX which would be forced into a budget price range on the Commodore 64

Expandable?
Rather restricted. There are a few light pens, disc drives around, but the amounts and variety is limited and prices are high

Overall
Though well made with good Basic and a few good games, the first batch of MSX machines do not seem like good buys There is a real danger of their being left on the shelf both literally and metaphorically.

When to buy
If you really want an MSX machine, it's worth hunting around They are on sale for very low prices

Spectrum
Z80 based microcomputer with 48K Graphics resolution of 256 by 192 but problems when trying to use colour to that resolution The colour resolution is lower and this means that the infamous 'attribute problems occur when, for example in games with moving figures, the objects change colour as they move past different backgrounds The sound is appalling one channel simple beep that stops all other processing activity Continuous sound with fast moving graphics is therefore impossible, although clever programming can get around this Limited ports, user edge connector, TV output, load and save, and that's it. The keyboard on Spectrum + is plastic without a step (in early models if you turned it upside down the keys fell off)

Software
Unrivalled Not only does virtually every software house in the country produce material for the Spectrum, but some of the most innovative material appears first on this machine Pioneering work by Ultimate Play the Game amongst others raised the level of what was possible and could be expected from the Spectrum Quality products also helped in the development of an extensive range of budget software

Though nobody's first choice as a business machine since, amongst a thousand other things the Spectrum doesn't even have standard disc drives, there is a reasonable amount of such material around

Expandable?
Most of the Spectrum's deficiencies can be remedied, Centronics interfaces, and joystick ports are a first choice Sinclair's Interface one gives a serial port and the controller for Microdrives – Sinclair's special form of disc drive that has the qualities of being very small and not always working properly Proper disc drives are available though not necessarily compatible with most software

Through sheer force of popularity, Spectrums are well served in almost any kind of peripheral going

Overall
The Spectrum is not a good computer (Letters to the editor please.) It was, however, a price busting computer and deservedly became a massive success and that fact alone is enough to make it worth placing high on anyone's list

When to buy
The only reason to wait is that there will be a 128K Spectrum early next year which might force a small price cut on the Spectrum +. What is worth while is looking out for the Spectrum 48k (rubber key version), this can sometimes be bought cheaply and is exactly the same internally as the Spectrum + With the money you save you could then buy a decent keyboard

QL
A 68008 based machine This chip is one of the 'new wave' of processors that will (at some point) replace the existing technology The 68008 is essentially the same as the 68000 found in the ST.

The QL has two microdrives built in, a flat Spectrum + style keyboard with five function keys and 128K as standard Screen resolution is a maximum of 512 by 256 pixels meaning that a monitor is necessary for best effect Eight colours are available, although there are ways of combining them to make extra colours

The machine has a fine Basic called SuperBasic which contains features beyond those found on the BBC It also comes with four generally well regarded software packages, *Archive*, *Easel*, *Quill*, *Abacus* which are database, business graphics, word processor and spreadsheet respectively

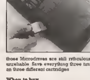
Hardware spectacular

Sound facilities, true to Sinclair form, are dire. One channel only, although this time it doesn't hold up the rest of the processing. A step forward, I suppose. Main ports: two serial, two joystick (non standard) video, TV, memory, Rom.

Software
Poor. Though the machine has been out for a while there are few quality packages available. The games, in particular, are below Spectrum quality for the most part, ridiculous given the extra power of the machine. Business packages are better; Sinclair has put out a few cash programs and training packages of some merit. Independent houses have mainly concentrated on programming languages and the like. However, with the price drop from £399 to £199 the situation may change.

Expandable?
Proper disc drives are available, as is a centronics interface for most printers. Generally, the basic peripherals like modems, joysticks, disc drives have turned up. The more esoteric stuff has not, for example, no light pens or speech synthesisers as yet.

Overall
A flawed machine which mixes exciting new elements with drastic bodges in even measures. It has a powerful processor but, despite everything Sinclair says,



those Microdrives are still ridiculously unreliable. Save everything three times on three different cartridges.

When to buy
Won't get much cheaper, but could be worth waiting to see if more software turns up. A maybe if the included business packages are all you'll need.

Enterprise 128
A Z80 based machine with 128K expandable almost infinitely. Centronics and serial interfaces for both printer connection and networking come as standard as does monitor and stereo hi-fi connections. The Enterprise has a specially designed sound chip to give it four quite powerful sound channels. The graphics chip is similarly specialised, capable of 672 by 512 pixels and 256 colours.

The Basic is fairly good and the large 48K Rom is extensive and well designed. The keyboard is a disappointment, however, being somewhat Spectrum + in style featuring flat plastic keys. An unusual feature is a built-in joystick which simulates cursor movement, but it is short and rather unreliable looking.

Software
Only from Enterprise. This machine has little independent support. Enterprise are doing quite a good job of releasing interesting software for the machine and the best of it is well up to Spectrum/Commodore standards.

Expandable?
Potentially very expandable. Enterprise provide Ram and disc drives and indeed the main slogan when the machine was launched was 'with obsolescence built out'. But a wide range of peripherals depends on the long-term success of the machine and that is in doubt.

Overall
A powerful well designed machine (except in the keyboard and looks department) that deserves to do well but isn't really doing so at the moment.

When to buy
No imminent price drop likely. Worth watching to see how it fares over Christmas. It isn't dead yet, but warrants caution.

Bytes & Pieces

Joystick on C64 by Peter Graves

Embarrassment time – observant Commodore owners will have noticed that several lines of last week's Commodore listing were severely cut off in their prime. Our apologies – the full program is now in your possession.

```
100 REM JOYSTICK REGISTER OPERATION    BY PETER GRAVES
110 POKE 646,1 POKE 53281,6 POKE53280,6
120 GOTO  1000
130 PRINT "" PRINT TAB(11) "JOYSTICK OPERATION"
140 PRINT TAB(7) "              F ] ← [ ↑"
150 PRINT TAB(7) "BIT  7 6 5 4 3 2 1 0"
160 PRINT TAB(11) "┌┬┬┬┬┬┬┬┐"
170 PRINT TAB(11) "|||||||||"
180 PRINT TAB(11) "└┴┴┴┴┴┴┴┘"
190 PRINT TAB(7) "DECIMAL " PRINT "NOW OPERATE THE JOYSTICK IN PORT 1!"
200 POKE1410,(PEEK(56321)AND1)+48 POKE1408,(PEEK(56321)AND2)/2+48
210 POKE1406,(PEEK(56321)AND4)/4+48 POKE1404,(PEEK(56321)AND8)/8+48
220 POKE1402,(PEEK(56321)AND16)/16+48
230 PRINT"" TAB(15) PEEK(56321),"= PEEK(56321)" GOTO 200
1000 REM
1010 PRINT CHR$(142)
1020 PRINT "SETTING UP - WAIT A MOMENT!"
1030 POKE52,48 POKE56 48 CLR POKE56334,PEEK(56334)AND254 POKE1 PEEK(1)AND251
1040 FORI=0TO1023 POKEI+12288 PEEK(I+53248) NEXT POKE1 PEEK(1)OR4
1050 POKE 56334,PEEK(56334)OR1 POKE 53272,(PEEK(53272)AND240)+12
1060 FOR N=12520 TO 12527 READ A POKE N,A NEXT
1070 FOR N=12504 TO 12511 READ A POKE N,A NEXT
1080 DATA 0,8,12,254,254,12,8,0
1090 DATA 0,24,24,24,126,60,24,0
1140 GOTO 130
```

Token exchange on Spectrum by S Martin

Token Exchange is a short machine code routine. Its main purpose is to exchange a specified token, ie *Print*, for another specified token, ie *LPrint*.

To use, the listing should be entered and then *Run*. If the OK message appears the code should be saved thus:

Save "token-ex" Code 65320,48

Now *Poke* 65358,CODE (token to be replaced) and *Poke* 65359,CODE (replacement token). Then *Randomise Usr* 65320. If all is well you should now have your Listing with your required replacement(s).

The routine should be loaded by *Clear* 65319 then *Load* "" *Code*.

Hence this very simple routine not only allows one to say replace *Print* statements with *LPrint* statements, etc, but also allows the programmer to cheat the Basic interpreter by entering lines such as **20** *Rem* 3,2 then calling the routine. One could have a line such as **20** *Screen$* 3,2 which is totally illegal.

```
  5 REM 48k version
 10 REM TOKEN EXCHANGE
 15 REM BY S MARTIN
 20 REM GOING=65358
 25 REM COMING=65359
 30 CLEAR 65319
 40 FOR a=65320 TO 65367
 45 READ d
 50 POKE a,d
 60 NEXT a
 70 DATA 42,75,92,237,91,83,92,237
 75 DATA 82,229,193,42,83,92,58,78
 80 DATA 255,87,126,186,40,8,35,11
 85 DATA 120,177,32,244,201,118,58,79
 90 DATA 255,119,24,242,118,118,0,0
 95 DATA 118,118,118,201,0,0,0,0
100 REM RANDOMIZE USR 65320
```



Whirlybird

Program *Tomahawk* **Micro** Spectrum **Price** £9.95 **Supplier** Digital Integration, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ

Cue *Ride of the Valkyrie* I'm swooping over a smoothly drawn 3D vector graphics landscape at 80 knots, just 20 feet above the ground. On the radar my computer indicates the course necessary to intercept the first enemy target I swoop round, tilting dramatically, and head off into enemy territory

It's in sight and they're firing at me I prepare to fire, tilt my nose down and KA-POW, KA-POW!

Tomahawk is Digital Intergration's sequel to *Fighter Pilot* and this time it's the turn of chopper pilots with the US Army Advanced Attack Helicopter at their command. While conventional aircraft simulators are ten a penny on the Spectrum, this is distinctly different and it boasts the added adrenalin booster of armed combat. It's really most satisfying to be able to stop on an (airborne) sixpence, fire guns or guided missiles, suddenly drop even fly backwards when you engage the enemy

Controlling the machine is surprisingly simple Just keep an eye on the relevant control panel and info, balancing the nose tilt with the collective (lift) to obtain movement and thanks to the ultra clear instructions you too will soon be flying at Trainee level, though with the addition of crosswinds and infra red night flying, plus three higher levels there's plenty to keep you busy Whether you choose joysticks or the keyboards the controls are easily picked up

My only problem with the game was that it uses the much heralded anti-piracy system, Lenslok.

Tomahawk is likely to be the first available game to use it and as such Digital Intergration have learnt the hard way In its initial form many people, myself included, found that it resulted in a maddening guessing game as time and time again we failed to identify the code Sensibly Digital Integration immediately set out to modify the system . Providing it's sorted out the problem, Digital has a winner with *Tomahawk*

John Minson

Choices

Program *Multi-Basic Rom* **Micro** BBC Model B/B+ **Price** £39.95 **Supplier** Cambridge Microprocessor Systems Software, Unit 18, Industrial Estate, Chelmsford Road, Great Dunmow, Essex CM6 1XG

Usually the term multi-tasking evokes ideas of large business computers sorting huge databases whilst simultaneously running a word processing package The *Multi-Basic* Rom, from CMS, may not be in this league but it certainly places some very useful tools at the Basic programmers' disposal

The Rom provides a number of new commands which are designed to allow the user to write programs which appear to perform more than one task at a time, without resorting to machine code Amstrad users have the command *Every* built into their Basic This instructs the computer to stop whatever it is doing and perform a specific subroutine every so many seconds Having performed the routine, the execution of the main program continues from the place at which it was interrupted The Multi-Basic Rom provides the BBC user with a similar command, plus much more.

The Rom is enabled using the command **Multi*, it doesn't devour any user Ram, but it does make extensive use of zero page. This will not trouble the Basic programmer, but should be born in mind by the machine code buff.

The pieces of code which the user wants to run as "background" routines must first be defined as *Tasks*. These can be thought of as *Procedures* which are specific to multi-Basic. The main two commands for calling these *Tasks* are *Every* and *Whenever* *Every* performs a named task every n centi-seconds *Whenever* performs its task whenever a specified event occurs, eg, a key press

The *Rom* is accompanied by an excellent 150 page spiral bound manual. This provides sufficient information to satisfy both expert and novice alike The applications for such a piece of software are endless in both the home and industrial environments

Jon Revis

Traditional

Program *Souls of Darkon* **Micro** Any Amstrad CPC **Price** £7.95 **Supplier** Task Set Software, 13 High Street, Bridlington, YO16 4PR.

Task Set have produced some of my favourite arcade games, first for the Commodore and more recently for the Amstrad and Spectrum computers This is the first adventure I have seen from then and I'm glad to say that I wasn't disappointed.

Technically it is rather a traditional affair, text and graphics with a predominantly simple verb/noun input It also has a tendency to say 'You can't do that' a trifle too often (check out Melbourne House's *Morden's Quest* for a classic lesson in anticipating almost every possible input, together with a plausible explanation of *Why* you can't do something). Vocabulary and clues of a kind are available on request.

On a more positive note there are quite long and atmospheric passages of text, for once not sacrificed because of the graphics The pictures are unusual in that they are drawn in high res on a yellow background rather than using several colours In fact they work well, have a character all of their own, and appear almost instantly.

I found the plot quite addictive, set on an alien world dominated by the evil Daskon using a kind of hybrid technology/magic.

It is your job to depose him of course and in the early stages it will be a task of moderate difficulty There are other characters there to help, although thankfully they don't sing or move around of their own accord

Well worth the money for adventure fans and there is probably much more to it that I haven't seen yet. I know that Task Set rate it highly, and they have excellent standards

Tony Kendle

Tally Ho

Program *Battle Of Britain* **Micro** CBM64/Spectrum/Amstrad/Atari **Price** £9.95 **Supplier** PSS, 452 Stoney Stanton Rd, Coventry CV6 5BR

In July 1940 the German High Command started preparations to invade England and christened the plans "Operation Sealion". The battle commenced in earnest on August 10th and went down in history as one of the most courageous of WWII. It resulted in the defeat of the German Luftwaffe, and the cancellation of "Operation Sealion".

Now it's your chance to relive those glorious days, chaps, so get out the false handlebar moustaches, check out the old Spitfire and commence to do battle.

PSS are old hands at this type of computer wargames, combining strategy with a certain amount of arcade action. The strategic level of the game is played on a map depicting the South East/West of England and Northern France, you are in control of Fighter Command and your task is to deploy squadrons of Spitfires and Hurricanes against the incoming squadrons of the Luftwaffe. You must bear in mind such things as limited flying time, ammunition, availability of landing strips to refuel and the size of the invading squadrons, which usually consist of bombers and fighters.

Movement of your forces is joystick controlled, done by moving a white box around the screen and covering a graphic symbol, eg. aeroplane, radar base, etc, and pressing the fire button. An instant readout is flashed onto the screen informing you which squadrons are ready to 'scramble' and the strength of the base. Once scrambled you can move the squadron anywhere on the map to intercept the German forces, messages will tell you when the fighters need to refuel or when a squadron is lost.

A certain amount of tactical play must be adopted to be successful, positioning your forces at the correct points of interception is crucial. On interception you can chose whether to play the arcade sequences or not, I found them rather repetitious and was glad I had a choice.

There are three levels of play, the Training game, Blitzkrieg and the very challenging Campaign game; the latter is played over 30 days with the option to save each day's play – excellent when you've just finished fighting off 300 aircraft.

I found the game well presented with clear, concise instructions and able to generate the right mental feeling, which made me, on seeing one rather large invasion force, cry out in desperation. Certainly a game that will make your head hurt and your hands sweat!

Roger Garrett

Flip out

Program *Batalyx* **Micro** Commodore 64 **Price** £8.95 **Supplier** Ariolasoft Retail

Yes folks, softwares' answer to Neil from the *Young Ones*, that age old psychedelic hippie Jeff Minter is back from semi retirement, and presents us with another weird and wonderful, colourful extravaganza full of the usual Minter touches and copious notes and excellent music.

Batalyx is really six games in one. A game system, if you like, and after setting the time duration – from an hour down to five minutes – you can, by pressing 1-6, skip from one game to another as the mood takes you and the scoring is carried across from one segment to the next.

Game one is a called *Hallucin-O-Bomble*™ and has a little robot droid trying to take out all manner of strange shaped aliens – smashing stuff. The next game is an updated version of *Attack of the Mutant Camels*; game three puts you on the back of one of those camels riding toward its pyramid base trying to activate it by following a trail of spheres, a test for your reactions here. On to *Chuppy on the Run* – very strange this one – all about painting walls (*Q-bert* style) and zapping lights, oh well.., next comes my favourite, *Syncro II* which presents us with bouncing spheres and a bunch of coloured grids with rotate. The idea is to make the spheres come to a halt by skillfully changing the speed of selected grids which alters the flight pattern of the spheres.

Finally is a version of *Psychedelia* that superb program that lets you do just about anything with patterns set to music. Select this as a breather between bouts!

Andy Moss

Face to face

Program *I, of the Mask* **Micro** Spectrum **Price** £8.95 **Supplier** Electric Dreams Software, 31 Carlton Crescent, Southampton, Hampshire SO1 2EW

Shouldn't that be Me, of the Mask? No worry, because this is as much an enigma as its author, Scottish sculptor Sandy White, who first came to fame with *Ant Attack*.

Now he's back. This time your tiny figure has been consigned to a giant maze to undergo a testing. He runs around these corridors, which are obviously not the corridors of power – just look at the energy drain – until he comes to a junction where he encounters three crystals. With limited ammunition he can shoot one for a long distance teleport, one for a short hop and the third reveals part of a robot that must be assembled from the feet first by shooting the relevant section three times.

While the corridor graphics aren't 100% smooth the effect of the madcap charge round the maze is aided by the frantic animation of the figure. But there's little to do in the corridors, with the game almost steering itself. My first reaction was disappointment. Then I began to look at it from a different perspective. Seen as a strategy puzzle *I, of the Mask* makes more sense. You have to figure out where the nearest crystals are, where the teleports will take you, where the robot sections are, and all within the power constraints.

I'd only recommend this with reservations. Sandy's Solid Soft techniques no longer look so novel but the more cerebral puzzler may like it. As I said, an enigma.

John Minson

A commanding position

More new commands for your QL brought to you by ***James Lucy***

Following on from last week, here is the resident extension to Superbasic to convert hex numbers to decimal. Unlike the opposite conversion, the vectored utilities provided in the Rom for the purpose are not fully functioning in early versions of the Rom, so routines have been included here.

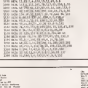
Two functions are added to Superbasic, *Dec* and *Dec2*. *Dec2* returns the two's complement value of a two, four or eight character hex number; *Dec* returns the true value of the same arguments. Thus *Print Dec2('FFFF')* will return -1 whereas *Print Dec('FFFF')* returns 65535.

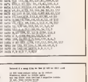
One of the drawbacks of QL Superbasic is the absence of long integers, floating point (FP) and word integers are the only types allowed. Included in the FP arithmetic package is a conversion from integer to floating point, but no longer integer conversion. This difficulty is compounded by the fact that the 68008 multiply instruction is only of size word, which means that for long hex conversion it is soon necessary to resort to the arithmetic package.

This program is about ten times slower than last week's, taking hundredths of a second rather than thousandths, but it still won't keep you waiting. Other assemblers will need a (PC) term inserted in LEA instructions and different characters to denote comments, among other things.

The Basic loader program should be saved and the cartridge removed before running – a slip in data entry can cause the machine to run amok! Anyone who doesn't feel like typing in all those numbers and is short of microdrives can obtain the program on microdrive from me on receipt of £2.25 + strong SAE at 2 Rookery Lane, Gt Totham, Essex.

```
[illegible]
```


[illegible]


[illegible]

```
[illegible]
```


[illegible]

Before your very eyes

The final helping of this fast save/load routine on Spectrum from ***John Pickford***

From last week, you should now have two programs saved to tape – the turbo load and turbo save routines. Now type in Program Three (below) and save it with, save *"HEADER" Line 9999*

Right; now you're ready to test it. First find no old game with a loading screen (*Atic Atac* will do). We'll use the loading screen because it's easy to see if anything goes wrong. Now load in Program Three followed by the turbo-save routine (program one last week). Enter 16384 for the start address and 6912 for the length. Enter anything you like for the filename, it won't make the slightest bit of difference. For those of you with no imagination try "A Loading Screen", which, by sheer coincidence, is 16 characters long (the maximum length of a filename)

Now insert the cassette with the game on it and press play. When the screen picture has loaded the border will go all funny and the computer will make a buzzing noise, do not worry, this is normal. Now insert a blank cassette in your datarecorder, press *Play Record*, then any key on the computer. If everything has gone well the screen should be saved to tape at double speed.

To load it back, reset the machine, type *Clear 65214* and load in the turbo-load routine (Program Two last week). This is the moment of truth (exciting isn't it?), type *Ramdomize Usr 65215.Pause O*. If you haven't made a mistake then you should now see the message *"Searching* ... " at the bottom of the screen. Now insert the cassette with the newly recorded loading screen and press *Play*. After a few seconds you should see the message *"Found:- A Loading Screen Loading"* and the screen$ will load before your eyes at twice the normal speed.

The sequence described above can be used to save any code file (not Basic). All you need to know is the length and start address of the file. To convert some commercial software you may need a 'Tape Header Reader', which can be found in most Tool Kit programs. You may also have trouble with programs which use memory above address 65214, because the code overlaps the *Save & Load* routines. This can be solved by loading the code into a lower address and then moving it up with a simple machine code program.

If you can't be bothered to type in all the listings, I would be happy to supply you with a copy of all the routines for £2.50 (casstte) or £4.50 (microdrive). Send cheques to J Pickford, 11 Oldham Avenue, Stockport, SK1 4BG.

```
   1 REM Program Three
   2
   3 REM1985 J.Pickford
   4
   5  REM  HEADER MAKER
   6
   7
   8
   9
  10 PAPER 0: BORDER 0: INK 7: CLS
  20 INPUT "Start Address of file? ";ea: RANDOMIZE ea:
POKE 23312,PEEK 23670: POKE 23313,PEEK 23671: PRINT ''"
START ADDRESS:";ea: BEEP .1,1
  30 INPUT "length of file? ";le: RANDOMIZE le: POKE 23
314,PEEK 23670: POKE 23315,PEEK 23671: PRINT ''"
LENGTH:";le: BEEP .1,1
  40 DIM n$(16): INPUT "Filename?"; LINE n$: FOR f=1 TO
 16: POKE (23295+f),CODE n$(f): NEXT f: PRINT ''"      F
ILENAME:";n$: BEEP .1,1
 100 PRINT ''''"      *LOAD FILE FROM TAPE*": LOAD ""COD
E ea
 150 FOR f=1 TO 4e4: OUT 254,PEEK 23672: BORDER 1: IF I
NKEY$="" THEN  NEXT f
 200 IF ea=16384 THEN  PRINT £0;AT 1,0; INK 8; PAPER 8;
"FOUND:- ";n$;" LOADING"
 300 RANDOMIZE ea: LET l=USR 65215
9998 STOP
9999 CLEAR 65215: PRINT "LOAD TURBOSAVE ROUTINE": LOAD
""CODE : RUN
```


This boy is a fugitive.
FIREBIRD


This girl is dangerous.
FIREBIRD


This lady is deadly.
FIREBIRD


This man is harmless.
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[illegible]	9.95	7.35
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Fight Night	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]

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[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
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Menu manipulation

The first of three parts of a comprehensive database for the 64 – by ***W Sabbagh***

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The program

Com File is controlled by two primary menus, which in turn lead to secondary menus (up to three levels) Although this may sound difficult to use, in practice it only takes minutes to learn how to use the program

The first of the primary menus is concerned with defining the file format, although a format defined previously can be loaded from disc or tape separately

The second primary menu is concerned with manipulating the data file. Several options are offered, most of which lead to their own secondary menus (such as printer menu, save/disc house-keeping menu, or calculation menu)

More instructions and listing next week.

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[illegible]
```



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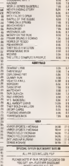
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Speech generator

Sound sampling on Amstrad – Paul Hardcastle impressions made easy by ***Brian Cadge***

The program presented here allows you to add speech synthesis easily to any Basic program – no extra hardware is required and the program will run on any Amstrad CPC. The method used to generate speech is that of 'Digital Recording'. The advantage of this technique over allophone methods is that the 'accent' of the speech can clearly be heard – for example, a male voice is clearly distinguishable from a female voice. The disadvantage of this method is that it is relatively expensive in terms of memory usage.

Program notes

The speech is sampled (recorded) from the cassette deck (built in on the 464, external on the other machines) and is reproduced by software using channel B of the sound chip – this gives equal output to left and right speakers if played back through a stereo amplifier. To use the program, type in the basic loader program – taking care with the data statements. If you have made no mistakes then two new RSX commands are added to Basic, these are *|RECORD* and *|REPLAY*.

The *|RECORD* command has the following format: **|RECORD, start, length** where *start* is the address from where incoming data is to be stored, and *length* is the number of bytes to be stored. As the program itself sits at the top of Ram from 42000 onwards, a good place to start putting data is at 30000 – remember to lower HIMEM first. For example, record yourself saying '3-2-1 Popular Computing' on cassette – the louder and clearer the better – put this tape in the Amstrad tape deck and type the following: **MEMORY 29999: |RECORD,30000,10000**

The cassette motor is turned on and a message to 'Press Enter to start recording' is displayed – this is to enable you to position the tape ready to input the speech. As you hear "one", press *Enter* and the sound from the cassette will be sampled and stored in Ram.

Now to replay this sound use the *|REPLAY* command as follows, **|REPLAY,30000,10000** and you should be able to recognise yourself saying 'Popular Computing' fairly clearly. *Replay* can also take a third optional parameter to specify volume. If this is left out, as in the example above, then a default value of seven is assumed, but you may specify any volume from 0 to 15. Try: **|REPLAY,30000,10000,15**, and you will hear "Popular Computing" at twice the volume.

It soon becomes apparent that the more sound you wish to store, the more Ram it uses. In fact about one second of speech uses about 1K of Ram. Of course, you can store any number of separate sounds as long as you note the start and length addresses. For example, in a game you might want to have the computer say *'Game Over'* and *'Well Done'* at appropriate points. This speech could be presampled from tape and saved as a binary file – loaded in with the game. Then, using appropriate addresses with the *|REPLAY* command within the game will allow the phrases to be spoken at the correct time.

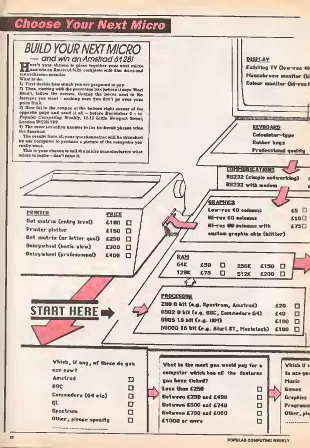
Sound is sampled from the cassette read data port used to load programs, and is reproduced via the AY-3-8912 sound chip using channel B.

As the program is so time critical it must run with interrupts disabled whilst sampling and reproducing the sound. Therefore the sound chip is accessed directly rather than by using the OS routine MC-SOUND REGISTER.

Experience has shown that anything recorded at a level of less than 0 db will be ignored by the cassette hardware, therefore speech to be sampled should be recorded at a higher level than normal (the higher the better). Although the program can sample any sound from the cassette deck, I have found that only clear speech with little background noise can be satisfactorily reproduced.

There are countless uses of speech synthesis within all types of programs, limited only by your imagination, and your Ram!

```
10 'Digital Speech Basic Loader
20 MEMORY 41999
30 FOR i=42000 TO 42320
40 READ a$:v=VAL("&"+a$)
50 cs=cs+v:POKE i,v
60 NEXT i
70 IF cs<>41144 THEN PRINT"DATA ERROR - Check listing";CHR$(7):STOP
80 CALL 42000
90 CLS:PRINT"New commands loaded - you can now NEW   this loader program."
100 END
110 DATA C3,3A,A5,F3,E5,DD,E1,06,08,AF,CD,35,A4,CD,2F,A4,17,10,F7,DD,77,00
120 DATA DD,23,1B,7A,B3,20,EA,FB,C9,26,11,25,20,FD,C9,C5,06,F5,ED,60,CB,14
130 DATA C1,C9,F5,3E,C0,06,F6,ED,79,06,F4,F1,ED,79,06,F6,3E,80,ED,79,06,F4
140 DATA ED,49,06,F6,AF,ED,79,C9,CD,A7,0C,F3,3E,03,0E,00,CD,3E,A4,3E,07,0E
150 DATA 3D,CD,3E,A4,3E,02,0E,00,CD,3E,A4,C9,E5,D5,CD,5A,A4,D1,E1,A6,08,C8
160 DATA 06,C5,DC,98,A4,D4,A5,A4,E5,26,01,CD,31,A4,E1,C1,10,ED,23,10,7A,03
170 DATA 20,E5,CD,A7,0C,FB,C9,F5,3E,09,0E,09,CD,3E,A4,F1,C9,F5,3E,09,AE,00
180 DATA CD,3E,A4,F1,C9,FE,03,20,0E,DD,7E,00,E6,0F,32,9F,A4,DD,23,DD,23,10
190 DATA 00,FE,02,C0,3E,09,32,9F,A4,DD,5E,00,DD,56,01,DD,6E,02,DD,66,03,CD
200 DATA 74,A4,C9,DD,5E,00,DD,56,01,DD,6E,02,DD,66,03,FE,02,C0,06,F6,3E,10
210 DATA ED,79,E5,21,1A,A5,7E,B7,28,06,CD,5A,BB,23,18,F6,CD,19,BB,FE,0D,20
220 DATA F9,3E,E0,CD,5A,BB,E1,CD,13,A4,3E,00,CD,5A,BB,3E,E1,CD,5A,BB,CD,71
230 DATA BC,C9,50,72,65,73,73,20,45,4E,54,45,52,20,74,6F,20,73,74,61,72,74
240 DATA 20,72,65,63,6F,72,64,69,6E,67,3A,00,01,44,A5,21,59,A5,CD,D1,BC,C9
250 DATA 4C,A5,C3,AF,A4,C3,D9,A4,52,45,50,4C,41,D9,52,45,43,4F,52,C4,00
```



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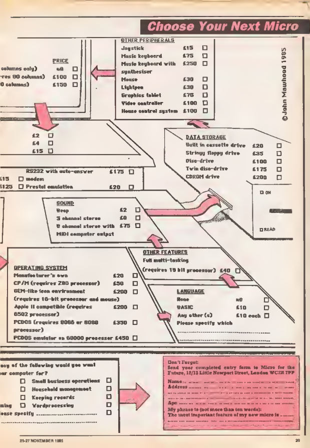
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....

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...ming ☐	Wordprocessing	☐
...lease specify		☐

....

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Name ....
Address ....
....
....
Age ....
My phrase is (not more than ten words):
The most important feature of my new micro is ....
....

Play it again, Sam

Now you've composed the music – how to use it in your own programs – on BBC B by Cy Noble

This is the last in a series of three programs for creating music on the BBC B. This one uses the tune data created by the first Program, Creator. It interrupts whatever the computer is doing 50 times a second, using the frame sync event, and tops up the sound channel buffers with the sound data currently required then calls and Osword operating system routine to play the sound. If the buffer is full it exists without doing anything.

Being machine code it is so fast you notice nothing and the computer appears to be doing two things at once. You could be writing a program, printing a listing, have graphic animation going and the music keeps playing. This is how it is done in all your favourite games – by machine code routines like this one.

After you've typed in the programs (and saved them) and debugged them you'll have a means of writing music easily and quickly for performance on the Beeb. If you don't feel up to doing all that work (a monumental task) then send £10 to me for a cassette containing the entire suite of programs. If you send £11.50 you get a five inch disc with all the programs plus two demo tunes, plus all three articles in this series in *Wordwise* format. A three inch disc costs £15 because they are more expensive for me to buy.

The listing is copiously Remmed and the workings are explained there, so here I'll tell you how to use it.

This program assembles machine code at &900 as written. It takes up just over one page of memory (a Page = &100 – ie, 256 – bytes) and will keep playing the music over and expand over until Break or until you command it to play another tune. Bear in mind that as the routine is more than one page it will overlap part of the next page. Now page &900 is where the function key definitions live and page &C00 is used if characters are redefined with *VDU 23*. For example, if you define more than four envelopes then envelopes five onwards take &10 (ie 16 decimal) bytes each starting at &900 so the best location to assemble is at &940 if you've got eight envelopes. I've deliberately Put the 'set up' subroutine at the end because once it has been called it is of no further use and can be overwritten if required. As long as the address for 'switch' does not go above &AFF even a hard break will not disturb the essential parts. Next week, more listing and the final instructions.

```
10REM Title  JTMUSIC
20REM By Cy Noble
30REM 323 North Circular Rd.
40REM London N13 5JH
50:
60REM Caution: if you define more
70REM than 4 envelopes then &900
80REM should be changed to
90REM some other suitable address
100REM (see text)
110:
120interupt=&900:REM Alter to suit
130osbyte=&FFF4
140osword=&FFF1
150tune1adr=&1100:REM Change these
160tune2adr=&1400:REM addresses to
170tune3adr=&1800:REM suit (see text)
180bufadr=&8D:tuneadr=&8E:REM +&8F
190:
200PROCassemble
210CALL setup
220CLS
230:
240IF FNchecksum<>32888 PRINT"Checksum erro
r"CHR$7;PRINT"Check your assembly code":END
250CLS:PRINT"Save assembled machine code ?"
260PROCquery
270IF CX<3 THEN 400
280INPUT"Name for machine code file "mcfile
$
290PROCquery
300IF CX<3 THEN 280
310SA$="SA "+mcfile$+" "+STR$~interupt+" "+
STR$~(endcode+1)+" "+STR$~setup
320PROCcassette("RECORD")
330PROCquery
340IF CX<3 THEN 250
350OSCLI SA$
360*MOTOR 0
370:
380REM checksum should be 32658
390:
400CLS:PRINT"Note these for reference
410PRINT"Load address for tune 1=&";~tune1a
dr
420PRINT"Load address for tune 2=&";~tune2a
dr
430PRINT"Load address for tune 3=&";~tune3a
dr
440PRINT:PRINT"changetune routine at &";~ch
angetune
450PRINT"switch=&";~switch
460PRINT"setup=&";~setup
470PRINT"checksum=";FNchecksum
480PRINT'"Load a tune Bess ?"
490PROCquery
500IF CX<3 END
510:
520INPUT"Name of tune data file "tune$
530INPUT"Name of envelope data file "env$
540PROCcassette("PLAY")
550PROCquery
560IF CX<3 THEN 480
570tune$="LOAD "+tune$+" "+STR$~tune1adr
580OSCLI tune$
590env$="LOAD "+env$+" 8C0"
600OSCLI env$
610*MOTOR 0
620?switch=1:REM or 2,3 etc (see text)
630CALL changetune
640END
650:
660DEFPROCassemble
670FOR PASS=0TO1
680P%=interupt
690[OPT PASS*3 \ change to PASS*2
700:
710.event       \ Check if it is the
720CMP #4       \ event we want i e
730BEQ event1   \ vertical sync - and
740JMP out      \ get out if not
750:
760.event1      \ it is our event so
770PHA          \ save all the
780TXA          \ registers
790PHA
800TYA
810PHA
820:
830.checkbuffer\ calculate the sound
840LDY #0       \ channel buffer and
850LDA #251
860SEC
870SBC buffer,Y
880TAX
890LDY #255
900LDA #128
910JSR osbyte
920CPX #0       \ if x is zero it is
930BNE event2   \ full up and we
940:
950.exit        \ restore the
960PLA          \ registers and
970TAY
980PLA
990TAX          \ get out
1000PLA
1010.out
1020JMP (&230)
1030:           \ Otherwise -
1040.event2     \ we check to see if
1050LDA notecount \ all the notes have
1060CMP howmany \ been played.
1070BNE doosword \ do play the next
1080LDA tempadr  \ one if out of
1090STA tuneadr  \ set the pointers
1100LDA tempadr+1 \ back to the
1110STA tuneadr+1 \ start of the
1120LDY #0       \ data table for
1130STY notecount \ this tune -but the
1140LDA (tuneadr),Y \ first byte is
1150STA howmany  \ how many notes
1160INC tuneadr  \ & this is the 1st
1170JSR expand   \ expand & put note
1180JMP checkbuffer \ in buffer & check
```

Tony Bridge's Adventure Corner



Final Quill

In thus, the last of our current look at *Quill'd* adventures (though we shall of course see more in the future), let's discuss more programs from readers. Kevin Maddox of Rainford has sent me his adventure which he calls *Elfindor*. Presentation is quite good, featuring an old-English typeface that is legible enough for the player to be able to discern two spelling mistakes and a punctuation mistake on the first screen. Now, every one is fallible, of course, but at least the opening screen should be presentable! However, though pre-*Patch* and pre-*Illustrator*, the game is quite playable, with a lot of combat.

Ambushed

The scenario is of the genus Fantasy/Stab-and-Slash, concerning your quest for the Golden Bow and Arrow of Gondor, stolen by an Orc from the body of ambushed Dwarf, Krane. Kevin goes out of his way to ensure that I realise just how complex the whole thing is (though complexity doesn't necessarily mean a good adventure), and I can believe him. He neglected, however, to tell me how to fight back when attacked, so I wasn't able to progress very far. But the game is very colourful and there seems to be a great number of locations, with lots of objects.

Kevin tells me (though I haven't tested the information) that these objects have uses which *are* not always so apparent, so a lot of to-ing and fro-ing is required in order to find out what they all do. I like this sort of puzzling, and the author tells me that even he takes 500 moves to complete the adventure, so a good long game is guaranteed for all! And it is just £3.50 from: Sigma Soft 8, Pine Dale, Rainford, Merseyside WA11 8DP.

One of the places in which *The Quill* would come in very useful is the classroom: there have been one or two "educational" uses of the utility, a notable example being the *Jack in Magicland* series from Turtle Software, which uses an elegant alternative to the two-word input and its attendant frustrations and delays a multiple-choice format.

```
You are standing in the public
bar of the BLACK HORSE.
Exposed timber beams give the
place an olde worlde atmosphere
and a blazing fire in the
corner gives you a feeling of
security.
Exits are to the
You can also see:-
local villagers

I'm ready for your instructions.
```

Ghosthunters from Duncan Bowen

Some while ago, I mentioned the Duncan Bowen School of Ashford in Kent – the computer club there got together and did just that, creating their own Quill'd adventure, featuring, naturally enough, scenes and characters from their own locality.

Ghosts

Another way of using *The Quill* is in giving the player a tour of a real landscape, which seems to be a good way of introducing some local history: this has been done before, too, but Duncan Bowan's *Ghosthunters* new game seems to have taken things a step further, in getting a group to work on an adventure featuring local colour.

Near Ashford is a village called Pluckley, reputed to be the most haunted in England. Your task is to escape the village, using knowledge you have gained from a mysterious book in the local library. Find the six missing pages and the attendant ghosts and Bob's yer Uncle. The adventure is a good one, fairly dripping with atmosphere – the mists draw in across the darkening fields as you wander around the village, and of course you come across all the famous real-life (?) ghosts of the neighbourhood.

The game is worth-while, and although I would like to know more about the involvement of the computer club in the writing of the adventure, the collaboration has seen good results. If you'd like to know more about the experiences and problems they had, or indeed just fancy having a closer look at the adventure, contact Mr J Fleming at Duncan Bowen Youth Wing, Kingsnorth Road, Ashford, Kent TN23 2LY.

Kentaylor is another program dealing with a school, though this time written by just one of the pupils, Roy Stead. Concerning, as it does, a particular school and the adventure would seem to appeal mainly to those who happen to frequent the school or the parents and friends thereof. Most of the problems have solutions which can only be found by someone with intimate knowledge of the characters and locations – for example, the shape of Mark's nose (not entirely unadjacent to that of Concorde!) is not a fact known to millions, but it is a rather important clue in the solving of the adventure.

For this reason, the storyline may not appeal to a wide audience, but to those in the know it should be worth having a look. Roy Stead, 34 Cherry Sutton, Hoogh Green, Widnes, Cheshire WA8 9TN.

Geographical *Quill'd* adventures, as I've said, have made a few appearances, and I looked at one some time ago from Nightingale Software, *Operation SOS*: the geographical aspect of this adventure is not the be and end-all of the game but nevertheless is far enough out of kilter to be annoying.

Fridaysoft feels strongly enough about this subject to have released their own attempt at a stroll around London's landmarks in the guise of a quest for the secret combination to a safe deposit box – *London Adventure* on the Spectrum.

One hundred locations are skilfully linked together to give a good feeling of walking around a real London. The problems are fairly logical, though the limitations of *The Quill* make for some ugly command requirements. I would recommend you look at this realistic, occasionally amusing and reasonably priced (£4.95 on cassette and £6.75 on microdrive) wander through the streets of London. Fridaysoft, Unit F, The Maltings, Station Road, Sawbridgeworth, Herts CM21 9JX.

Tony Bridge

```
I am standing beside the Thames.
The murky waters flow towards
the sea.To the south is a tall
ship,to the north-west is a
bridge.I see a tunnel.

Tell me what to do.
ENTER TUNNEL
As I'm frightened of the dark,
I can't do that.

I'm ready for your instructions.
```

London Adventure from Fridaysoft

Arcade Avenue

Entombed

The bad news this week is that there was a bug in the *Entombed* routine printed a couple of weeks ago However, Kenneth Devlin writes to tell me that he has a better routine available now, one that doesn't use the screen Ram to store the code The disadvantage of the first routine was that if you accidentally caused the screen to scroll everything was ruined

So instead of attempting to correct the first routine here is Kenneth's effort instead, complete with checksums to catch errors. Where Kenneth uses the '/' character you should press the Enter key.

To get into the game we are going to create a new loader for it. Get a blank cassette and type in the following program·

10 T=O | *For* A=20000 *TO* 20023 | *Read* B | *Poke* A,B | T=T+B | *Next* 20 *If* T<>2662 *Then Print* "ERROR IN DATA" | *END* 30 *Data* 169, 43, 141, 40, 3, 169, 78, 141, 41, 3 96 169, 192, 141, 62, 3, 169, 255 141, 64, 3, 78 40 *Data* 237,248

Lives

Ran this and if the error message appears check the listing. Type SYS 20000 / and press *Shift/Runstop* and play the *Entombed* tape Once loaded type *Poke* 20012,2 / *Poke* 20017,18 / *Poke* 49431,170 / *Poke* 49342,11 / *Poke* 43 167 / *Poke* 45,174 / Poke 46,194 / Put the blank tape into the cassette and press record. Type SYS 20000/*Save* "ENTOMBED", 1,1 /

Once this has been done switch the computer off and on again. The new loader only needs to be created once Now to get infinite lives, type in the following program

10 *For* A=3876 *TO* 3003 | *Read* B | *Poke* A | T=T+B. *Next* 20 *If* T<>3278 *Then Print* "ERROR IN DATA" | *END* 30 *Data* 169, 96, 141, 192 108, 169, 8, 162, 8, 96 40 *Data* 163, 4, 189, 163, 11, 157, 158, 8, 202, 208, 247, 78, 80, 8, 32, 160, 11, 234

Run it, if an error message appears again check the data. Rewind the blank tape and press *Shift/Runstop* to load the new loading Once it has gone in, swap the tapes and *Entombed* will load as normal.

Blackwyche

Let's finish off the set now with Kenneth's routines for *Staff of Karnath* and *Blackwyche* For *Staff* type in and *Run* the following -

10 T=O | *For* A=20000 TO 20037, *Read* B, *Poke* A,B | T=T+B | *Next* 20 *For* A=3742 *To* 2759 *Read* B | *Poke* A B | T=T+B *Next If* T<>6363 *Then Print* "ERROR" *END* 20 *Data* 169, 43, 141, 40, 3, 169, 78, 141, 41, 3, 96, 169, 162 141, 62, 3, 169, 255, 141, 64, 2, 76 40 *Data* 237, 246, 120, 162, 15, 189, 26, 192, 157, 26, 3, 202, 305, 847, 68, 66 80 *Data* 169, 141, 141, 246, 8, 169, 6, 141, 246, 3, 169, 22, 141, 247, 3, 78, 5, 8

Type *SYS* 20000 / and press Shift/Runstop to load the first part of Staff. Once loaded type *Poke* 1005,182 / *Poke* 1006 10 / *SYS* 20024 and the program will load , without the normal multi-coloured border, giving you infinite energy Even though the percentage energy on screen will go down, once it reaches zero it will clock back up to 100%.

Blackwyche is the simplest of the lot. Just enter and run the following program and it will load the loader Alter it and load the rest of the game

10 *Sys* 63279 | *Poke* 830,100 *Poke* 831,174 *Poke* 832,102 *Sys* 62828 20 *For* A=679 TO 767 | *Poke* A,*Peek*(25088+A) *Next* 30 *For* A=828 TO 1200 *Poke* A,*Peek*(25088+A) *Next* 40 *Poke* 990,141 | *Poke* 991 74 *Poke* 992,16 *Sys* 1024

Simplest

Once again the program will load without the border effect, and the energy display will still decrease, but will clock back to 99 on reaching zero Kenneth's most recent letter also included some pokes for the Broderbund game *Stealth* so here they are. *Load* the game as normal and reset the computer

Poke 30298,lives

Entombed

Poke 30590,173 for infinite lives

Poke 28512,132 for infinite energy

Poke 28241,169 / *Poke* 28342,0 / *Poke* 28343,234 - no collisions

Sys 63058 to restart

Kenneth writes that on completing level 5 of *Stealth* a quote appears from some famous person Every time you reach level five a different quote appears

To see all of these try one of the ASCII code printing routines we have published over the last couple of weeks on locations 29392 to 38364

Ghostbusters

Backpack

Finally here are some pokes for *Ghostbusters* Load the game and then reset it

Poke 34777,169 infinite traps

Poke 34446,234 / *Poke* 34447,234 infinite energy

Poke 34351 163 no backpack energy loss after crossing the beams

Poke 29164,169 / *Poke* 29186,3 / *Poke* 32425 169 infinite men

Poke 38454,96 / no decrease in money

Poke 29931, × where × is the initial amount of cash. To calculate the value of × remove the last four zeros from the cash number and convert the remainder to a two digit number Multiply the first figure of the remainder by 16 and add the other to the remainder figure, eg, for $500000 the value of × is 5*16 + 0 = 80. For $90000 it is 0*16+9=9

Wonder game

I had hoped to have a special treat here for Spectrum owners in the form of a cheat routine for the Edge's new wonder game *Fairlight*. Unfortunately Chris Allen who was working on the program tells me that it has one of the most convoluted and intricate protections on the loader you can imagine It is possible to crack it, but the routine necessary to do so is correspondingly long

However, if anyone is really desperate to get their hands on the cheat routine, send Chris and SAE and £1 to cover his time and trouble, and he will write back with a full explanation. You can contact him at 41 Westmorland Road, Felixstowe, Suffolk

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10 FOR c=1 TO 5
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45 NEXT c
50 IF [illegible]=1176984 THEN GOTO 60
55 IF [illegible]=1344360 THEN GOTO 7[illegible]
60 PRINT "Your matching Micro Magic number is ";[illegible]
61 PRINT "Better luck next week"
[illegible]
70 PRINT "Your matching Micro Magic number is ";[illegible]
71 PRINT "You have won an Amstrad 6128!"
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80 PRINT "Your matching Micro Magic number is ";[illegible]
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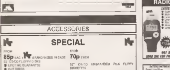
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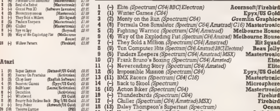
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3	(–)	Back to Skool	(Microsphere)	£6.95
4	(3)	Daley Thompson's Super Test	(Ocean)	£6.95
5	(5)	Way Of The Exploding Fist	(Melbourne House)	£8.95
6	(2)	Impossible Mission	(Epyx/US Gold)	£8.95
7	(–)	Saboteur	(Durell)	£8.95
8	(4)	Starquake	(Bubble Bus)	£9.95
9	(8)	Fairlight	(The Edge)	£9.95
10	(7)	Fighting Warrior	(Melbourne House)	£8.95

Bubbling Under

Gyroscope/Spectrum (Melbourne House), Computer Hits (5)/Spectrum (Beau Jolly), Scarabaeus/C64 (Ariolasoft), Tau Ceti/Spectrum (CRL); Waterloo/C64/Spectrum (Warmaster); Entombed/C64 (Ultimate); I of the Mask/Spectrum (Electric Dreams), Spike/Spectrum (Firebird), Battle of Britain/Amstrad (PSS).

All figures compiled by Gallup/Microscope

Top Twenty

1	(–)	Elite *(Spectrum/C64/BBC/Electron)*	**Acornsoft/Firebird**
2	(1)	Winter Games *(C64)*	**Epyx/US Gold**
3	(2)	Monty on the Run *(Spectrum/C64)*	**Gremlin Graphics**
4	(8)	Formula One Simulator *(Spectrum/C64/Amstrad/C16)*	**Mastertronic**
5	(3)	Fighting Warrior *(Spectrum/C64/Amstrad)*	**Melbourne House**
6	(4)	Way of the Exploding Fist *(Spectrum/C64/Amstrad)*	**Melbourne House**
7	(–)	They Sold a Million *(Spectrum/C64/Amstrad)*	**Hit Squad**
8	(9)	Ten Computer Hits *(Spectrum/C64/Amstrad/BBC/Electron)*	**Beau Jolly**
9	(5)	Finders Keepers *(Spectrum/C64/Amstrad/MSX)*	**Mastertronic**
10	(7)	Frank Bruno's Boxing *(Spectrum/C64/Amstad)*	**Elite**
11	(–)	Neverending Story *(Spectrum/C64/Amstad)*	**Elite**
12	(6)	Impossible Mission *(Spectrum/C64)*	**Epyx/US Gold**
13	(11)	BMX Racers *(Spectrum/C64/C16)*	**Mastertronic**
14	(–)	Back to Skool *(Spectrum)*	**Microsphere**
15	(10)	Action Biker *(Spectrum/C64)*	**Mastertronic**
16	(–)	Thunderbirds *(Spectrum/C64)*	**Firebird**
17	(–)	Chiller *(Spectrum/C64/Amstrad/MSX)*	**Firebird**
18	(13)	Daley Thompson's Supertest *(Spectrum)*	**Ocean**
19	(12)	Hacker *(Spectrum/C64/Amstrad/Atari)*	**Activision**
20	(–)	Saboteur *(Spectrum)*	**Durell**

Figures compiled by Gallup/Microscope

Readers' Chart No 51

1	(1)	Way of the Exploding Fist *(Spectrum/C64/Amstrad)*	**Melbourne House**
2	(2)	Fairlight *(Spectrum)*	**The Edge**
3	(5)	Hypersports *(Spectrum/C64)*	**Imagine**
4	(6)	Red Moon *(Spectrum/C64/Amstrad/BBC/Electron)*	**Level 9**
5	(–)	Monty on the Run *(Spectrum/C64)*	**Gremlin Graphics**
6=	(4)	Now! Games *(Spectrum/C64)*	**Virgin**
=	(3)	Bored of the Rings *(Spectrum/C64/BBC)*	**Delta 4/Silversoft**
8	(7)	Frank Bruno's Boxing *(Spectrum/C64/Amstrad)*	**Elite**
9	(–)	Nightshade *(Spectrum)*	**Ultimate**
10	(9)	Flight Simulator II *(C64)*	**Sub-Logic**

Winning Phrase No 51 "Hello Tosh, got a new Amstrad?" from Robert Dunning, of Middlesbrough, Cleveland who wins £25 Honourable mentions to R Robertson of Mossend, Lanarkshire with "Garfield – world's stoutest feline" and Hazel Williams of Sevenoaks, Kent with "Wot no pop? Laser explodes at sea – get my drift?".

Now voting on week 53 – £25 to win

Each week *Popular* is compiling its own special software top ten chart – compiled by YOU.

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever – but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's Readers' Chart, published above.

You can still vote in the chart without making up a slogan – but you won't be in with a chance of winning the prize.

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP

Voting for Week 53 closes at 2pm on Wednesday November 27 1985. Entries received after that time will not be eligible for inclusion in that week's voting. The judges decision is final. Only one entry per individual per week will be allowed.

Name .... **My top 3: Voting Week 53**

Address .... 1.....................................

.... 2.....................................

.... 3.....................................

My phrase is: ....


Sir Fred



"WHEN IT COMES TO SOFTWARE-I LIKE TO BE FIRST ON THE BALL"
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COMMODORE 64 (Disk and Cassette.)
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AXIS ASSASSIN
OUT NOW
D-BUG
D-Bug is a game within a game in a computer within a computer. There you are playing an action/strategy game called Gotcha! against the computer or a friend. Suddenly, the D-Bug computer operating the game breaks down. You must then discover the fault and fix the 'Bug' causing the problems.
COMMODORE 64 (Disk and Cassette.)
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OUT NOW
KAISER
Imagine yourself in the year 1700. You are the ruler of a small German province. You manage crops and estates and you lay down all the economic and social laws. The more successful you are, the higher you climb in the hierarchy of the nobility, gradually becoming more and more powerful, in order to take control of the whole of Germany as the Kaiser.
AMSTRAD (Cassette.) COMMODORE 64 (Disk and Cassette.)
ATARI (Disk and Cassette.)
KAISER
SAUCER ATTACK
OUT NOW
SAUCER ATTACK
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COMMODORE 64 (Disk and Cassette.)
bug blitz
OUT NOW
BUG BLITZ
Your mission is to find and destroy an army of mutant bugs who have made their homes in caverns deep beneath the planet's surface. A labyrinth of dangerous tunnels leads you down to these caverns which you must negotiate skilfully in your spaceship. Once you've destroyed the bugs in a cavern, you must return through the tunnels to the planet's surface.
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BY D.K.MARSHALL

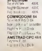
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Event	Dates	Venue	Admission	Organiser
... Christmas Show	November 22-30 10 00am-6 00pm	Central Hall London SW1	£2.00 adults £1.00 children (in advance)	... 01-346 6666
Third ... Show	November 26-28 10 00am-6 00pm	Royal Horticultural Hall London SW1	£2.00 adults £1.00 children (in advance)	... 01-346 6666
Christmas Microfair	December 14	Horticultural Hall London SW1	£1 75 adults £1 25 children	Mike Johnston 01-802 8579

The Rogue Program

The Rogue Program

THIRD AND MOUSE

FFOOOM

It's fragments scattered the Universe, silent tomb-stones to the Maxins existence. Untill in sector F1C3 of Maxin's known Universe a crystaline segment entered a small green planet's atmosphere; a planet YOU CALL ...

The EARTH ...

Created entirely using a BBC micro and a AMX mouse

continued next week

New Releases

STOP-GAP

Fighting Warrior, one of the most truly violent games, I have ever seen, has now been converted to the Commodore 64 with impressive results

The Spectrum original was a sort of mini *Way of the Exploding Fist* where you marched along beating the brains out of a series of mythical adversaries. Its thump thump thump as you inflict blows to any vulnerable part of the opponent's body

The Commodore version lacks some of the fine graphics detail of the Spectrum original but makes up for it with bigger and more varied graphics It features a particularly vicious dog that goes straight for the throat as well as the nasty half beasts, half men that fight more conventionally, eg, with big sticks

For Commodore owners just getting a fraction tired of *Way of Exploding Fist* after playing it continuously, this could prove a useful stopgap

Program *Fighting Warrior*
Price *£9 95*
Micro *Commodore 64*
Supplier *Melbourne House*
Castle Yard House
Castle Yard
Richmond
Surrey

FUTURISTIC

Why don't people like the Atari? Old as the machine is many of the games on it still look excellent A case in point is *Elektra Glide* from English Software

This is one of the most addictive, high speed, adrenalin raising road games I've yet seen.

It's hard to convey its magic by describing the plot, which is simply driving along the track watching out for a host of futuristic obstacles that will come your way These include strange monoliths and bouncing balls, you will have to watch for their shadow and steer quickly to one side to avoid.

The game is played in sections, with a time limit to reach each one Time is tight, so you have to go as close to flat out as you can manage Watch out too for the tunnels which you must steer slickly through

The plot isn't the point, however, the game is beautifully designed with a clever sense of travelling through a vast landscape Graphics and graphic scrolling is particularly fine without the sudden jerks found on similar games

Pick of the week

A HARD LINE



If all educational software was like *Yes Chancellor* from Chalksoft, things would be different Though definitely educational, this program is just about the most entertaining economy management game I've ever played

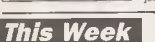
The idea is to run the economy – raising money and deciding where it should be spent. This involves keeping everyone happy (happy enough for you to be voted back in again in the fifth year of office) balancing tax revenue against public sector spending and wage demands

Within the confines of what is possible with a program which essentially only consists of text and numbers this program is well presented, intelligent use has been made of colour to differentiate problem areas from those that need attention and within each section there is a brief resume of the kind of options you have, eg, lowering taxes makes everyone happy but can have bad effects on inflation

There are various sections to the game, trade, public spending, government stocks, tax thresholds and the inevitable wage bargaining This latter section has produced some of the most vicious reactions in the office from some ordinarily liberal to leftish people I've ever seen Suffice to say that a harder line was taken in fiction than Mrs T would ever dare to take in real life

Survive long enough and you really do get a feel for how it all fits together, albeit in simplified form. You also learn the cynical lessons – if it's election year you don't raise taxes If you or your children are studying economics this is a must If you have enjoyed management games in the past, then this is one of the best ever

Program *Yes Chancellor*
Price *£17 50*
Micro *BBC (on disc)*
Supplier *Chalksoft*
PO Box 49
Spalding
Lincs PE11 1NZ



This Week

Program	Type	Micro	Price	Supplier
Don't Panic	Arc	Amstrad	£3 95	Firebird
Cauldron	Arc	Amstrad	£3 95	Palace
Chimera	Arc	Amstrad	£3 95	Firebird
Dummy Run	Arc	Amstrad	£8 95	Mikro Gen
Willow Pattern	Arc	Amstrad	£3 95	Firebird
Quiz Quest	Ed	Amstrad	£7.95	Alligata
Ball Blazer	Arc	Atari	£8 95	Activision
Centre Ville	Ed	BBC	£17 50	Chalksoft
Early Maths	Ed	BBC	£7 95	Willow
Early Words	Ed	BBC	£7 95	Willow
Forensic	Ed	BBC	£17 50	Chalksoft
Fat Man Sam	Arc	BBC B	£3 95	Firebird
Microcosm	Arc	BBC B	£3 95	Firebird
Star Drifter	Arc	BBC B	£3.95	Firebird
10 Pack Vol 2	Arc	Commodore 64	£10 00	Automata
10 Pack Vol 3	Arc	Commodore 64	£10 00	Automata
Chicken Chase	Arc	Commodore 64	£3.95	Firebird
Chimera	Arc	Commodore 64	£3.95	Firebird
Sabre Wulf	Arc	Commodore 64	£9 95	Firebird
Thunderbirds	Arc	Commodore 64	£3 95	Firebird
Underwurlde	Arc	Commodore 64	£9 95	Firebird
Wild West	Arc	Commodore 64	£9 95	Ariolasoft
Willow Pattern	Arc	Commodore 64	£3 95	Firebird
Yaks Progress	Arc	Commodore 64	£9 45	Llamasoft
Star Drifter	Arc	Electron	£3 95	Firebird
Chicken Chase	Arc	Spectrum	£3 95	Firebird
Chimera	Arc	Spectrum	£3 95	Firebird
Don't Panic	Arc	Spectrum	£3 95	Firebird
Three Weeks Paradise	Arc	Spectrum	£9 95	Mikro Gen

The sound is similarly impressive, rhythmic and driving

I found myself playing this one again and again and car games usually bore me A Commodore version is apparently well on the way on the strength of this, I'd expect it to be a winner

Program *Elektra Glide*
Price *£8 95*
Micro *Atari*
Supplier *English Software*
1 North Parade
Parsonage
Gardens
Manchester M60

LOW LEVEL

Though not quite *Sorcery*, *Cauldron* is nevertheless a fine Amstrad program. The task to collect six ingredients to turn your low level hag into the Witch Queen, involves a mixture of arcade shoot'em ups with Willy style timing skills It's a good conversion from the Commodore though may be a fraction slower

What makes the game is the quality and detail of its graphics and the way the balance between straight zap 'em to bit (bats in this case) and collecting/dodge challengers Simply flying your hag takes a little mastery - broomstick aerodynamics require a clearing and a run for take off although, conversely, landing seems to be possible on a VTOL basis

Our hag was bugged such that at one point she want into a perpetual spin whilst accumulating points though this should be norrected in recent versions Hag stability problems aside the game is a lot of fun and is another one of those titles that improves when it's converted to the Amstrad.



Program *Cauldron*
Price *£7 95*
Micro *Amstrad*
Supplier *Palace Software*
275 Pentonville
Road
London N1

ROLE-PLAYER

I would guess that the majority of people reading this have heard of a game called Dungeons & Dragons For those not in the know, its scenario is based in a Tolkien-like world where you play the part of an adventurous individual and explore dark dungeon complexes to fight evil monsters and generally get rich quick

The only problem with the system is that you need a games-master to plan out and guide you through the adventure and also several other people to make up a party of adventurers

Now imagine playing something akin to this against your computer In the upper left of your screen you have a 3D line display of the maze, maybe showing a fearful skeleton approaching you You study the map in the right hand window – no place to run Try talking to it – no good No weapons handy try a fireball Kerblammmm you have the satisfaction of knowing you have made the world a nicer place . even though there does seem to be something creeping up behind you Imagine all this . and you're getting near to *Swords & Sorcery*

Yes *Swords & Sorcery* the game that was due out a year ago, etc etc Well, it's finally arrived and all that programming has produced the answer to the lone role-player's prayer In fact if you are remotely interested in adventuring – and have a spare tenner – then *Swords* must become a serious contender for the Christmas present you would most like to buy yourself

Program *Swords and Sorcery*
Price *£9 95*
Micro *Spectrum*
Supplier *PSS*
452 Stoney Stanton
Rd
Coventry

HAIRPIN

It was just like Christmas in the *Popular* office this week First Commodore *Revs*, and now four new tracks for the original *Revs* on the BBC B Brands Hatch, Donington Park, Snetterton and Oulton Park All lovingly recreated by original *Revs* author Geoffrey Cramond The results are amazingly realistic

The systems works by first loading up the *Four Tracks* tape – and selecting one of the four from a menu More data is then loaded in – and finally you are asked to load the game itself It is important to note that you must already possess a copy of *Revs* to use the extra four tracks!

I immediately tried out Brands Hatch That right-hander after the pits suddenly dips down and you're falling then up to the hairpin carefuly round that then full out down the hill again to tackle Graham Hill band at full tilt Just like for real – only, if your neck is at stake, you tend to go a lot slower

Expect to crash a lot – just like before you got used to Silverstone – if you are a *Revs* fan then this can be classed an an essential purchase this Christmas

Program *Revs Four Tracks*
Price *£9 95 (cassette)*
£12 95 (disc)
Micro *BBC B*
Supplier *Acornsoft*
Fulborn Rd
Cherry Hinton
Cambs

This Week

Computer Wordsearch	S	Spectrum	£6 95	Softfirm
Icon Graphix	Ut	Spectrum	£9.95	Audiogenic
The Last Word	Ut	Spectrum	£15 50	Myrmidon

Key Ad–adventure **S**–strategy simulation
Arc–arcade **Ut**–Utility **Ed**–education

Activision, 15 Harley House Marylebone Road London NW1 01-486 7588 **Alligata,** 1 Orange Street Sheffield S1 4DW 0742 755796 **Ariolasoft,** Retail **Audiogenic,** 39 Sutton Industrial Park London Road Reading Berks 1AZ 0734 664646 **Automata,** 27 Highland Road, Portsmouth, Hants PO4 9DA, 0705 735242 **Chalksoft,** 37 Willowsea Road Worcester WR3 7QP 0905 55192 **Firebird,** Wellington House Upper St Martin s Lane, London WC2H 9DL 01-3796755 **Llamasoft,** 49 Mount Pleasant Tadley Hants 07356 4478 **Mikro Gen,** 44 The Broadway Bracknell Berks, 0344 427317 **Palace,** 275 Pentonville Road London N1 01-278 0751 **Softfirm,** 21 Ashbourne Way Thatcham Berks RG13 4SJ **Willow,** The Willows Wrington Lane Congresbury Bristol BS19 5BQ 0934 834056



Is it poetry?

The grillroom splashed and splashed.
Unbearably,
Some tiny bloodstain shrank and buckled, but
I dripped. You tickled my soft country. I
Eroded the pure wretched bead, although
Some aged garment smashed my heart, and yet
That smart soap drank some pain, while still we came . . .

By line two of this nonsense, you'd probably guessed that it was computer-written. In fact, I've trained my Spectrum to produce the stuff by the yard. It's verse – reasonably regular iambic pentameter, to be technical. But is it poetry?

Once, at a party, a guest told FR Leavis, fiercest of Cambridge English dons, that computers could now be programmed to write poetry. He replied with utter frostiness that anyone who believed that could have no conception of what a poem was. After all, he had spent his life trying to convince a not very interested world that a great poem, the result of a poet's complete dedication both to the truth and to the language with which he must express it, was the finest, most serious form of art conceivable.

Which is just one reason why it is interesting to see what actually can be programmed. My Spectrum's verses above started with a simple algorithm for producing grammatically correct English sentences from an arbitrary collection of nouns, verbs, prepositions, etc. Then I found a way of making them dance (rather clumsily) to the measure that is commonest in English verse. It would not be at all hard to program alliteration or most of the other technical devices of poetry.

What, however, is rather absent from the lines above is meaning in the terms used by experts in linguistics – or Artificial Intelligence – it is all right as syntax, hopeless as semantics. The connections suggested by the sentence structure are quite arbitrary, and bear no relation to any reality.

This need not always be the case, however. Computers are quite capable of producing sensible Artificial Intelligence; researchers have made progress on providing them with detailed scenarios corresponding to aspects of the real world. I could have included in my program some indication of the class of objects that are able to splash (dolphins, or paddle-wheels, or water-buffalo) and the computer could easily be told to hunt for a sensible and appropriate noun, rather than grab the first that happens to fit the metre – in this case, grillroom.

Computers may be good at retaining detailed and accurate facts, but they are not at all famous for being original, profound or amusing. Human beings, on the other hand, can frequently produce utterances that are true yet astonishing and delightful, because they have continuous access to a fascinating and rich world through five senses simultaneously. Computers don't know anything that someone hasn't, directly or indirectly, told them. They're like an extreme case of swots, who remember everything teachers tell them, but never look at the world they live in.

Will this always be a limitation of machines? Or one day will they be able to make sense of the world without human interference? And if so, could they ever communicate to us the actual quality of their perceptions? It's remotely possible, but I don't think the communication would be much like human literature.

George Simmers

Puzzle No 184

The number 864 is very interesting! The sum of its digits (18) multiplied by the product of its digits (192) is equal to four times itself. Other numbers with this property are 18 and 48.

Can you find, apart from the trivial case of 1, two numbers such that in each case the sum of the digits multiplied by the product of the digits is exactly equal to that number itself?

Solution to Puzzle No 179

Of the possible 1296 different throws obtainable with four standard dice, 992 of them will result in a score of seven with any two, three, or all four dice. The remaining 304 combinations will not. This can be reduced to 62 out of 81 'hits' and 19 out of 81 'misses'. In other words, you would have slightly better than three winning chances out of four!

```
10 LET HIT=0:LET MISS=0
20 FOR A=1 TO 6
30 FOR B=1 TO 6
40 FOR C=1 TO 6
50 FOR D=1 TO 6
60 IF A+B=7 OR A+C=7 OR A+D=7 OR B+C=7 OR
   B+D=7 OR C+D=7 THEN LET HIT=HIT+1:GOTO
 100
70 IF A+B+C=7 OR A+B+D=7 OR A+C+D=7 OR
   B+C+D=7 THEN LET HIT=HIT+1:GOTO 100
80 IF A+B+C+D=7 THEN LET HIT=HIT+1:GOTO 100
90 LET MISS=MISS+1
100 NEXT D
110 NEXT C
120 NEXT B
130 NEXT A
140 PRINT HIT,MISS
```

As with most assessments of winning odds, there are many pitfalls, so the program generates all possible throws obtainable with four dice and tests each one of them. Line 60 tests for combinations of any two dice, Line 70 any three of the dice, and Line 80 all four. The fact that certain throws, such as 1,1 6, and 6 result in more than one possible way of achieving the required total does not affect the overall odds.

Variables *Hit* and *Miss* are incremented as appropriate, and after all possible throws have been examined the results are printed out.

Winner of Puzzle 179

The winner is M F Greenwood of College Terrace, Halifax, who will be receiving £10.

Rules

The closing date for Puzzle 184 is December 18.

The Hackers

Are you nearly finished testing that printer yet?
Yes.
I only have to check its speed in lines per minute.
& how long will you be?
Round about a minute I'd say.
SNAP!




ADVENTURE FOR COMMODORE 64 AND SPECTRUM 48K
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